

TROPICAL DISEASES BULLETIN

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SUMMARY OF RECENT ABSTRACTS

I CHOLERA

Epidemiology

LAL and his collaborators (p 157) have instituted a ~~comprehensive study~~ into the epidemiology of cholera in Bengal. There is considerable variation between districts in respect of cholera experience and the authors have, as a preliminary step divided the region into areas having homogenous cholera experience. They recognize three variables in the incidence of cholera—seasonal, annual and residual; the net endemicity has been determined by taking into account all factors and eliminating differences due to population density, size etc. and this has been used to classify the homogeneous district into endemic and non endemic group.

VERGHESE (p 158) reports that 1939 was a year of epidemic cholera in Orissa and that the coastal deltaic districts which in great measure remain submerged during the rains suffered most. Practically all the main water supplies are open to gross contamination and though the usual preventive measures of inoculation and disinfection of water are always adopted it would seem that more permanent measures are necessary. The chief of these would be the provision of large numbers of deep masonry wells. Temporary measures which have been taken in the past are regarded as wasteful and may be so in the future. The influence of fairs and festivals on cholera is noted. CHATTERJI (p 458) agrees with VERGHESE that improvement of water supplies is the most important permanent preventive measure but notes that the simultaneous adoption of drainage schemes is necessary to avoid the risk that stagnation of waste water may give rise to water borne diseases and malaria.

POLLITZER *et al* (p 159) state that an outbreak in Yunnan was initiated by two men who arrived from Kweichow. In the succeeding five months there were 3486 cases with 2515 deaths. KUBOTA (p 159) refers to an outbreak in Canton during 1939.

The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin* 1942 Vol 39. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

Aetiology

TAYLOR (p 43C) has issued a review of cholera research in India in which certain fundamental principles are laid down. In the investigation of the serology of vibrios standard O antigen was prepared from Inaba and Ogawa strains only, and from this (dried) antigen testing sera were prepared locally. It was found that the incidence of vibrios agglutinable with O group I was no greater in cholera patients than in the general population which indicates that such vibrios play no part in the pathogenesis of the disease. In India the El Tor vibrio is not known to exist except in certain waters of Bengal (but see below). A combination of positive Heiberg classification (mannose + arabinose - accharose +) positive cholera red reaction and negative Voges Proskauer reaction may justify a presumptive diagnosis of *V. cholerae*. Taylor points out that in cholera the carrier, such as is known in the case of the typhoid group, does not exist—the cholera convalescent and the contact carrier in most cases are free from the vibrio after five days from the onset of the attack or contact with the convalescent. *V. cholerae* can however persist for 16 days in water but has not been isolated except in immediate relationship with a cholera case. The cholera case, therefore, is the major factor in spread; contact with infected water sources act as intermediaries for short periods only and at short range.

VENKATRAMAN *et al* (p 160) however announce the finding of non-haemolytic vibrio indistinguishable from *V. cholerae* in two water sources of S. India in the absence of cholera.

VENKATRAMAN and RAMAKRISHNAN (p 458) take note of the difficulty of preserving viable *V. cholerae* in specimens of stool sent to laboratories for examination. They propose a preserving medium consisting of a buffered calcium solution the details of which are given. In a trial of this isolation of *V. cholerae* was effected up to 92 days after collection from 66 samples taken from cases in solution was possible in 64 in the field and in 60 in the laboratory. VENKATRAMAN (p 161) notes that cholera vibrio in 2 per cent salt solution containing 1:50,000 peptone with a pH initially of 9.2 survived as long as 198 days and that *V. cholerae* could be recovered for 21 days from faeces preserved in boric acid potassium chloride-buffered saline.

CAMPBELL RENTON (p 117) shows that cholera vibrios may remain viable after desiccation for 4 years but that in spite of this desiccation does cause death of a large proportion of the organisms. The haemolytic factor of El Tor vibrios was still present after four years of desiccation even in cracked tubes from which no growth could be obtained.

GOHAR (p 161) states that alkaline peptone water containing 1 in 1,000,000 potassium tellurite is a useful medium for the isolation of *V. cholerae*. The culture should be plated out after 8 to 10 hours at 37°C.

GORDON and JOHNSTON (p 617) have shown that the serum of the normal guinea pig is bactericidal for a number of organisms including vibrios and that after absorption with one organism the bactericidal property of the serum is reduced to that organism more than to others. By the use of this method it has been possible to detect antigenic differences between *V. cholerae* and related vibrios and to distinguish strains of *V. cholerae* which differ antigenically from the main group.

BANERJEE (p 618) has obtained a toxin from cultures of *V. cholerae* by dialysis into a cellophane sac containing normal saline. Toxin was prepared from the diffusate not by filtration which reduces toxicity but by centrifugation. Residual organisms were killed. There is little difference between toxin prepared from aerobic and that from anaerobic growth. The minimum lethal doses are 10 cc intraperitoneally for guinea pigs and 0.2 cc intravenously for mice.

READ *et al* (p 838) have confirmed by careful experiments under varied conditions the value of the haemolysis test first introduced by GREIG in 1914 for the differentiation of the true cholera vibrio from other similar vibrios including the Celebes and El Tor strains. Greig positive vibrios are defined as those which haemolyse goat erythrocytes during the first 24 hours of incubation. They belong to the early haemolytic group. Greig negative vibrios belong to the late haemolytic group in that haemolysis is usually partial and never takes place within 24 hours. The haemolysis they contain is probably identical with the haemodigestive ferment described by VAN LOGHUYT. In the late haemolytic group the haemolysis is partial hardly occurs in 24 hours and is abolished when the test is performed at 12°C or under restricted oxygen supply. Anti haemolytic sera prepared from the Greig positive organisms have a definite specific neutralizing effect on the haemolysins of the early haemolytic group. This is not so with the late haemolytic group.

READ and PANDIT (p 159) record the results of a search for true cholera vibrios and for vibrios of the El Tor type in India. These do not accord with the findings made in Celebes. The true cholera vibrio satisfying the criteria laid down for those of O group I by GARDNER and VENKATRAMAN were found in all except one of the clinical cases of cholera in 7 per cent of close contacts of cases and in 16 per cent of sources of water in direct contact with the cases but did not persist much longer than two weeks in any person or water. This vibrio with one or two exceptions was not found in the absence of the disease. The El Tor vibrio on the other hand was found usually in the absence of cholera though occasionally with the disease and was present in one area in which cholera had not appeared during the previous decade.

Although clinical cholera occurred some years ago in Celebes and was associated with a vibrio of the El Tor type there is no evidence that such an association occurs in India.

VENKATRAMAN *et al* (p 160) have also taken up this question with similar results. They place on record the repeated finding of the El Tor vibrio in open natural water sources in S. India in the complete absence of cholera.

VENKATRAMAN (p 161) reports the recovery of 21 strains of agglutinable vibrios from sources of water (mainly tanks) in the Cauvery delta of Madras. Of these strains 20 were haemolytic on first isolation but the haemolytic property varied considerably on later examination. An attempt is to be made to ascertain the significance of this type of vibrio in the epidemiology of cholera.

ANDERSON (p 161) has failed in an attempt to bring about reversion of water vibrios to true *V. cholerae* by growing them in the presence of appropriate anti phage serum. The basis of the experiment was the idea that water vibrios may have been produced from *V. cholerae* by the action of phage and that the removal of phage might permit reversal. PASRICHA *et al* (p 162) discuss a cholera phage of new

type which they designate type N. This is apparently the same as Bruce White's type LL and act only on *V. cholerae* being inactive on the magglutinable vibrios. In this respect it resembles type A. PAICLA and PAUL (p. 162) record the presence of bacteriophages against the dysenteric bacilli *Bact. typhosum* and *V. cholerae* in soil down to the level of 3 feet below the surface.

Pathology

BANERJEE (p. 162) has investigated the loss of chloride from the body in cholera. He found in the average of a series of cases that 9 gm. were lost through vomiting and 34.6 gm. from the bowel in the course of 24 hours. There was consequently diminished excretion in the urine. These patients were receiving about 25 gm. daily by injection. The result of this loss is marked hypochloroemia accompanied of course by haemoconcentration but the author claims that it is the hypochloroemia which is the major factor in producing retention of nitrogenous waste products and renal failure. Since the introduction of even a small quantity of hypertonic saline brings about improvement in the azotaemia whereas larger quantities of glucose solution do not. In cholera the acid base balance of the body fluid is greatly disturbed and for this the lack of chloride is held responsible. The deficiency of the chloride anion in plasma interferes with the exchange of the bicarbonate anions from cells to plasma. For these reasons the author suggests the use of 5 per cent solution of NaCl in treatment but in this respect his work is still in the experimental stage.

The same author (p. 163) discusses further the causes of renal failure in cholera. There is a fall in systemic blood pressure the arterial system being relatively empty and the venous system engorged especially in the splanchnic area. This leads to stasis in the capillaries shown in the kidneys by congestion. This capillary failure in conjunction with great loss of interstitial fluid and hypochloroemia is responsible for the renal failure.

TOIB (pp. 163-459) however attributes the renal failure in cholera to the irreparable damage caused to the kidney by lack of oxygen consequent upon collapse. Tissue asphyxia of this kind should therefore be treated by administration of oxygen after preliminary restoration of the circulation by intravenous saline or saline with plasma.

AHWORTH and ADAMS (p. 164) use the specific gravity of whole blood as the indicator of haemoconcentration and have calculated the relationships between this and the haematocrit, erythrocyte volume, haemoglobin content and number of erythrocytes. In shock the protein concentration and the specific gravity of plasma were not found to be satisfactory indicators of haemoconcentration since protein is lost from the circulating blood during the course of shock.

RELL (p. 165) likens the condition in crural oedema to that which occurs in cholera. He states that in cholera secretion of urine may be restarted even after suppression lasting for 2 days. For the accompanying acidosis intravenous sodium bicarbonate may be given. Calcium should be included in the solution and an excess of sodium avoided but alkali must not be given after the urine has become alkaline.

GHOSE and MUKERJEE (p. 690) put forward the view that in cholera there may be autolysis of *Bact. coli* in the alkaline contents of the intestine and that the product of this autolysis may be absorbed and

may play a part in aggravation of symptoms. They have found that the sera of cholera patients more commonly contain agglutinins for autogenous *Bact coli* than do controls and this lends *prima facie* support to their view.

Treatment

ALDRIDGE (p 165) discusses the treatment of dehydration in infants and his remarks are of interest in relation to cholera. In dehydration due to gastro enteritis the chief aim of treatment is to replace water and salts. It is not necessary to provide specially for loss of bicarbonate because it is the replacement of the sodium ion which is required [but see Russell above]. Oliguria must be relieved and for this glucose is given intravenously but should be given with care since its diuretic action may result in elimination of too much chloride or of too much water. The author argues against the administration of saline [but is not dealing actually with cholera the saline treatment of cholera is sufficiently well established]. He points out that the routine transfusion of blood is not advisable because haemoconcentration already exists. In patients with haemoconcentration who require more drastic treatment than parenteral injections of crystalloids plasma transfusion should be considered.

PASRICHA *et al* (p 166) show that febrile reactions which may occur after intravenous injections of saline solutions are frequently due to pyrogenic substances usually dissolved in the saline. These commonly are split proteins derived from bacteria. The authors give advice as to how saline can be prepared free from these substances and point out that salines for intravenous use should be prepared at a central source of supply by persons skilled in the necessary technique. PANJA *et al* (p 839) noted that patients receiving hospital hypertonic saline were prone to rigors and pyrexia. They describe their method of preparing pyrogen free saline and found that with this the reactions were greatly reduced. Pyrogen free saline can safely be administered to patients with high rectal temperature.

CHOPRA *et al* (p 459) have used sulphaguanidine in treatment the dose given was 1.0 gm initially and 0.5 gm every 6 hours for 72 hours. The case mortality rate in a series of 218 patients was 3.21 per cent against 6.38 per cent in a series receiving saline infusions only. This dosage is low and with larger doses the drug may be more effective [it will be remembered (this *Bulletin* 1942 Vol 39 p 320) that in acute bacillary dysentery in British troops the average dose was at times as high as 20 gm per diem to an aggregate of 135 gm]. Sulphaguanidine was not found to be toxic and the patients receiving it passed fewer stools and required less intravenous saline than the controls.

On the other hand CAPPOTHERS (p 838) concludes from an investigation in a group of patients treated with sulphaguanidine (0.1 gm per kilo followed by 0.05 gm per kilo every 4 hours) that this drug has no demonstrated value in the treatment of cholera. Salines were given in addition and the results were compared with those obtained in a control group.

GRIFFITHS (p 764) has found that if *V cholerae* is suspended in muen and injected intraperitoneally in mice a much smaller dose is lethal than if the vibrios are suspended in saline. He has used this technique in experiments on the protective action of the sulphonamides.

When 99.99 per cent of mice are usually killed by intraperitoneal injection of 500,000 living vibrios in mucin it was found that after a single injection of alphathiazole or sulphadiazine 99.99 per cent survived for 24 hours and 50 per cent survived the 7-day test period. Succinyl sulphathiazole and sulphaguanidine protected when given intragastrically. In cultivation tests he found that alphanilamide sulphathiazole and sulphadiazine inhibited the growth of *L. citreus* whereas sulphaguanidine and succinyl alphanilamide did not.

GOWAN (p. 161) makes the suggestion that potassium tellurite may be useful in the treatment of cholera in view of its strong antibacterial action towards members of the *Bacillus* group of organisms but in an editorial comment it is pointed out that the tellurites are extremely poisonous and that though tellurium is at one time used in the treatment of phylly with good effect it had to be abandoned on account of its toxicity.

IMMUNIZATION

PATRICK *et al.* (p. 166) have found that only 37 per cent of 200 samples of cholera vaccine passed both toxicity and potency tests. It is known that autoinfection may occur on keeping and to overcome this the author advises desiccation and re-suspension of the organisms in saline at the time of use. They found moreover that the antigens appear to be better preserved with dry state than in suspension. Referring to an outbreak in Yunnan Province POLLITZER *et al.* (p. 19) state that among 50,000 persons inoculated against the disease there were 16 cases only whereas among 120,000 not inoculated there were 208 cases.

Charles W. Haddock

MALARIA

FIELD (J. W.) Morphological Variation in *Plasmodium* in Grass & Feleku 1940—Parasites 1942 Vol. 24 No. 1 pp. 82-87 With 24 figures on 1 plate 15 refs

In this paper the author describes and figures two abnormalities in *Plasmodium falciparum* infection. In one case that of an elderly Cantonee there was a very heavy infection with over 100,000 parasites per cmm of blood. With this heavy infection however there was little febrile response which was accompanied by growth (trophozoites) chizont gametocytes which were typical *P. f.* but the ring forms were peculiar in that they were a marked tendency to multiple infections (four to eight per cell). The appearance was noted on one occasion only and a fortnight later the tendency had diminished while in 24 hours it had disappeared entirely.

The second case was that of an infant 16 days old. The infection may have been acquired from the mother. On the other hand it may have been the result of mosquito transmission. There was a heavy infection of a *P. f.* like parasite which differed from typical *P. f.* in that the mature chizonts occupied only two-thirds of the red cell, whereas in the mature form and produced usually from 8 to 14 merozoites. The infected cell though heavily supplied with enlarged than in typical *P. f.* malarial infections while they exhibited a

tendency to assume fimbriated outlines. The gametocytes were indistinguishable from those of *P. vivax*. It was not possible to study this case fully.

The various possibilities in the two cases are discussed and the previous records of similar appearances are reviewed. It is concluded that *P. vivax* under abnormal conditions is liable to exhibit abnormalities and that this is the explanation of the occurrence of the unusual forms in the two cases referred to.

C. M. Wenyon

ZUMPT (T.) Die Rassenfrage bei *Anopheles maculipennis* Meigen. I. Beitrag zum Problem der Artbildung und Artbegrenzung [The Question of Races in *A. maculipennis*. First Contribution to the Problem of Formation and Limitation of Species].—*Ztschr. Parasitenk.* 1941 Vol 12 Pt 3 pp 372-387 [Summary taken from *Rev. Applied Entom.* Ser. B. 1942 Aug Vol 30 Pt 8 pp 126-127].

The author discusses the systematic status of the European Anophelines of the group of *Anopheles maculipennis* Mg. At least seven of these have been distinguished but it is not yet agreed whether they should be regarded as distinct species or as varieties or biotype. They are *maculipennis* sens. strict. (*typicus*) *atroparvus* van Thiel *labrancheiae* Flin. *messeae* Flin. *melanoon* Hackett *subalpinus* Hackett & Lewis and *sacharovi* Favr. Still other forms occur outside Europe. Apart from *sacharovi* which differs in the adult these forms can be distinguished from one another only in the egg stage and an unpublished table by F. WEYER is given showing the distinguishing characters. Their geographical distribution is discussed from the literature with special reference to those that occur in Germany and the results of experiments on cross breeding are reviewed. The author then summarises the main conclusions of DOBZHANSKY (1939) as to the factors leading to the differentiation of species. The external factors are geographical, ecological or temporal isolation of originally homogeneous groups and the internal ones which result from the former and may persist after their disappearance are physiological modifications that hinder or prevent interbreeding between the individuals of different groups or render the offspring infertile. The forms of the *maculipennis* group though only slightly differing from one another in morphology have reached the stage of physiological differentiation but instinctive isolation (lack of a mutual inclination to pair) plays a great part in this since the production of fertile offspring by interbreeding is not yet excluded and doubtless occurs to some extent in nature. In view of the evident restrictions on interbreeding however the author considers that they should all be accorded specific rank and that in cases of doubtful identity a specimen should be recorded merely as belonging to the *maculipennis* group.

SCHWETZ (J.) Contribution a l'etude des anophelins du Congo oriental (Lac Kivu—Lac Albert) [Additions to our Knowledge of the Anophelines of the Region round Lake Kivu and Lake Albert Belgian Congo].—*Ann. Soc. Belge de Med. Trop.* 1941 Mar 31 Vol 21 No 1 pp 17-35.

The author has paid several brief visits to the area round lakes Kivu and Albert in the extreme east of the Belgian Congo. It seems

MOHR (Werner) Herz-Gefassstörungen bei Malaria [Cardiac Lesions in Malaria]—*Arch f Schiffs u Trop Hyg* 1940 Nov Vol 44 No 11 pp 521-531 With 9 fig

The author's remarks are based on a study of 260 cases of malaria. Macroscopically the changes are often so light as to pass unrecognized. There may be some degree of dilatation without hypertrophy, the muscle being flabby. It is the microscopic changes which by their multiplicity lead to the grosser lesion. The finer capillaries being partially in some cases completely blocked by the accumulation of parasites there results injury to the endothelium and absorption of the malaria toxin and at the same time malnutrition of the muscle tissue supplied by these choked capillaries. There are multiple small localized necroses and in the mass resultant softening of tissue and dilatation. In the early stage treatment will bring about restoration to normal but if it is neglected permanent mischief may ensue evidenced by the electro-cardiographic tracing. The dilatation may lead to relative alveolar inadequacy and the toxin absorption to extra systoles and irregular action of the auricle.

From the same cause says the author the aorta may also show dilatation. The changes in the rhythm of the heart beat however refer to toxic action on the vasomotor centres. Sometimes the malaria infection may be as it were the latent trigger the influence which makes evident a cardiac lesion which had till then been latent compensated and unperceived. Several electro-cardiographic tracings are reproduced illustrating the author's points. *H. Hald Scott*

KOPP (Israel) Plasma Proteins in Therapeutic Fever—*Jl Lab & Clin Med* 1942 May Vol 27 No 8 pp 1054-1062 With 3 charts 2 ref

This is a description of the changes in the plasma proteins of nine patients who were subjected to malaria infection, artificial fever and typhoid vaccine fever for treatment of syphilis of the central nervous system. Six patients were given *P. vivax* malaria only by the intravenous injection of 3 to 4 cc of malarial blood. One patient was given artificial fever and malaria, one patient tertian and quartan malaria and typhoid vaccine fever, and one patient typhoid vaccine fever only. Typhoid vaccine fever was induced by the intravenous injection of increasing doses of TAB vaccine usually three times a week. One patient was given 11 such injections, another 16. Artificial fever was induced by the inductotherm and humid heated air cabinet. Body temperatures were raised to 105-106 for two hours at each treatment. One patient received 14 such treatments within 38 days.

The onset of malarial fever was accompanied by a rapid progressive and marked reduction of plasma albumin. This reduction ranged from 30 to 40 per cent. Globulin fluctuated considerably but showed no consistent trend. Fibrinogen fluctuated in a similar manner. Termination of the malarial fever by quinine was followed by a rapid return to normal plasma protein content.

Fever produced by either typhoid vaccine or the inductotherm caused only slight fluctuation in the plasma protein fraction.

The author considers that the infectious process *per se* is probably the most important factor in determining the reduction of the albumin fraction in malaria by interfering with the synthesis of albumin in the

liver The increase in globulin which was more commonly observed in the malaria cases may be accounted for in part by the destruction of red cells
Norman White

DULANEY (Anna Dein) STRATMAN THOMAS (Warren H.) & WARR (Otis S.) The Diagnostic Value of Complement Fixation in Malaria—*Jl Infect Dis* 1942 May-June Vol 70 No 3 pp 221-225

The authors have previously reported the results obtained with complement fixation tests chiefly on patients undergoing malaria therapy [this *Bulletin* 1941 Vol 38 p 336] It was shown that complement fixation is correlated closely with the presence or recent presence of malaria parasites in the peripheral blood In most cases the antibody titre fell off rapidly after the administration of quinine to terminate the attack

Further work to determine the value of the test is now reported Sera of 675 persons have been tested 317 patients with symptoms which warranted examination of the blood for malaria parasites 170 patients suffering from febrile diseases of bacterial or protozoal nature other than malaria 188 symptom free individuals The *P knowlesi* antigen which was used in all cases was prepared in a manner very similar to that first described by COGGESHALL and EATON [this *Bulletin* 1939 Vol 36 p 404] For routine tests 0.1 cc of serum 0.1 cc of antigen and 2 units of complement were used Incubation in a water bath at 37 C for one hour was followed by the addition of sheep red blood cells and 2 units of amboceptor Readings were made after a second incubation of from 20 to 30 minutes

Of the 125 patients whose blood harboured malaria parasites 102 (81.6 per cent) gave a positive 3 to 4 plus reaction 23 gave a negative reaction About one third of the subjects in both groups had received some anti-malarial treatment Fifteen patients gave a positive complement fixation test at a time when the blood film was negative Malaria was ruled out as a diagnosis in 177 patients with negative blood films and negative complement fixation tests There was agreement between blood film and complement fixation tests in 279 of the 317 patients (88 per cent) Sera from patients suffering from leprosy, amoebic dysentery and Chagas's disease gave a high proportion of positive reactions Only 2 of 45 sera from patients with acute febrile diseases gave positive reactions There were 7 positive reactions among the 188 sera obtained from normal persons Thus it was shown that complement fixation using a *P knowlesi* antigen gives highly specific results in the diagnosis of malaria it may prove useful as a supplementary test to blood film examination

Norman White

BOYD (Mark F.) Criteria of Immunity and Susceptibility in Naturally Induced Vivax Malaria Infections—*Amer Jl Trop Med* 1942 May Vol 22 No 3 pp 217-226 With 12 figs

Patients submitted to malaria therapy at the Florida State are cosmopolitan and the white patients inoculated with vivax malaria show great variation in the character and duration of the infection they experience This study relates to 388 white patients successfully inoculated by infected mosquitoes between 1931 and 1941 with the McCoy strain of *P vivax* They include 162 patients who experienced

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H Harold Scott

KERN (Kern) Plasma Proteins in Therapeutic Fever — *J Lab & Clin Med 19 - Mar 1941 No 8 PP 1054-1062 With 3 charts*

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cases of malaria. He came to the conclusion that whereas in Europe a definite connexion was observed between deficiency of vitamin C and certain diseases such as gingivitis, the healing of skin lesions, etc., in West Africa this connexion could not be established. He found that though in lobar pneumonia and malaria there was increased consumption of vitamin C, he could not find any causal connexion between these conditions and deficiency of the vitamin.

The author working with KUHNER in 1939 found that in the course of an attack of malaria—seen in a case of inoculated disease—there was an increased demand for and use of vitamin C, an increase of 47–60 mm. *per diem*. Further in malarious sailor returning from a voyage to Africa more than the usual amount of the vitamin was needed.

Investigating next the influence of vitamin C on restoration of the blood picture to normal in convalescence from malaria, he found that additional vitamin brought about a better and quicker regeneration from malarial anaemia, the reticulocyte count increased as did also the haemoglobin. Again the author affirms that he could determine no causal connexion between malaria and avitaminosis C, the significance of the vitamin lies in the bringing about improvement in the convalescent state and in enhancing the value of iron. The combination of iron (10 pills of Ferro-stabil daily) with ascorbic acid (0.25 gm. as Canthan Cebon Redoxon) or in the form of ascorbic acid iron (Ferro-66) was given with much success in malarial anaemia.

The author lays stress on a fact which is obvious from the foregoing, that this has nothing to do with the proper treatment of the malaria itself by quinine, atabrin, plasmoquine, etc., but that together with the specific therapy more vitamin C is called for either by adding the vitamin itself or by giving a diet rich in this vitamin.

H. Harold Scott

MEYER (W.) Die Malaria als Volkskrankheit im europäischen Rußland und ihre Bekämpfung. [Malaria and its Control in European Russia.] —*Dtsch. Trop. Zeitsch.* 1942, Jul. I, Vol. 46, No. 13, pp. 239–253 (1942).

RUSSELL (Paul F.), KNIFE (Fred W.) & RAO (T. Ramachandra). A Water Emulsion of Pyrethrum Extract for Spray Killing Adult Mosquitoes. —*Indian Med. Gaz.* 1942, Aug., Vol. 77, No. 8, pp. 477–479.

It is now well established that transmission of malaria can be interrupted if the resting places of the vectors are effectively sprayed at suitable intervals. The spray generally used is an extract of Pyrethrum in kerosene. In this paper the authors report the successful use of an aqueous emulsion of Pyrethrum extract, the total cost of which was only one-sixth to one-third of the kerosene spray (Pyrocyde 20:1:19 mixture with kerosene) generally used in India. Twenty pounds of Indian grown Pyrethrum flowers were extracted with 12 gallons of kerosene, yielding 10 gallons of stock extract. On the day of use one gallon of this extract was diluted with three gallons or seven gallons of water in the presence of an emulsifier. (Rather better results were obtained with the stronger emulsion). Two emulsifiers were found satisfactory: Gardinol (sodium lauryl sulphate) at the rate of 23 gm. per gallon of emulsion and Primulal EML at the rate of one-third of a pound per gallon of emulsion. Very good results were

obtained in a spray testing chamber and in village houses in Madras. Owing to the slightly heavier droplets discharged by the nozzle of the spray gun when water is used it may be necessary to use slightly greater amounts of material. J. B. Wigglesworth

POGODINA (E. A.) & SOKOLOV (A. G.) [Alkaloidal Fogs for combating Mosquitoes]—*Med. Parasit. & Parasitic Dis.* Moscow 1940 Vol 9 No 1-2 [In Russian pp 109-111] [Summary taken from *Public Health Engineering Abstr.* Washington 1942 Aug Vol 22 No 8 p 14 Initialled D M V]

The effects of aerosols of anabasine sulfate and anabasine base on *Anopheles* mosquitoes were investigated by evaporating anabasine either by outside heating (evapn method) or by heating from an exothermal reaction such as slaking lime (lime method). In the lime method the following reactions take place on pouring an anabasine sulfate soln over unslaked lime $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2 + 15.5 \text{ kg cal}$
 $\text{Ca(OH)}_2 + (\text{C}_{10}\text{H}_{14}\text{N}_2) \cdot \text{H}_2\text{SO}_4 \rightarrow 2(\text{C}_{10}\text{H}_{14}\text{N})_2\text{SO}_4 + 2\text{H}_2\text{O}$
 anabasine (liquid) \rightarrow anabasine (vapor) - 1452 kg cal and condensation of a part of the anabasine vapors during cooling in air with the formation of colloidal size particles (fog). The mosquitoes were very sensitive to anabasine sol. The min lethal dose which was 100% effective against mosquitoes was 0.2 g of anabasine per cu m of air. The sol possesses an unpleasant specific odor producing coughing. Under summer conditions the sol is dispersed rapidly and no odor remains after 15-20 min. To accelerate the reaction at low temps the mixt must be heated or some dry lime added to the mixt to which some 20% H_2SO_4 is added. In the evapn method heat some and to 300-50 and place anabasine base (1.5-2.0 g/cu m) or alk anabasine sulfate (5-6 g/cu m) on the end. A 100% effectiveness against mosquitoes from the evapn method was also obtained. The oil had no harmful effect on rabbits and hens on the germinating properties of seeds or on food products. Both methods are also suitable when nicotine is used as the insecticide. [See also this *Bulletin* 1938 Vol 36 p 512 1941 Vol 38 p 510]

ROBERTSON (J. L.) JR, LE PRINCE (J. A.), JOHNSON (H. A.) & PARKER (W. V.) Observations on Experimental Malaria Control Drainage Ditch Linings—*Public Health Rep.* 1942 Mar 27 Vol 57 No 13 pp 451-463 With 14 figs on 8 plates

Much ditch lining work has been done in the city of Memphis and in Shelby County, Tennessee as a mosquito control measure with the object of determining what form of lining can be constructed at minimum cost with due regard to durability. Simplicity in construction methods is a further desideratum. Monolithic concrete linings, linings of brick and of precast concrete slabs were tried. Methods of construction are described in detail and constructional costs are given. Most of the ditches selected for study were typical field ditches three to four feet deep. The linings were made to cover the invert of the ditch and to extend up the banks a few inches above the observed erosion line. The banks were sloped 1½ to 1. After installation of the lining the banks were sodded with Bermuda grass sod. Cross section of a lining in a ditch three feet deep is shaped like the arc of a

cases of malaria. He came to the conclusion that whereas in Europe a definite connexion was observed between deficiency of vitamin C and certain diseases such as gingivitis, the healing of skin lesions etc. in West Africa this connexion could not be established. He found that though in lobar pneumonia and malaria there was increased consumption of vitamin C, he could not find any causal connexion between these conditions and deficiency of the vitamin.

The author working with KUHLE in 1939 found that in the course of an attack of malaria—even in a case of inoculated disease—there was an increased demand for and use of vitamin C, an increase of 47-60 mgm per diem. Further in malarious sailors returning from a voyage to Africa more than the usual amount of the vitamin was needed.

Investigating next the influence of vitamin C on restoration of the blood picture to normal in convalescence from malaria, he found that additional vitamin brought about a better and quicker regeneration from malarial anaemia, the reticulocyte count increased, as did also the haemoglobin. Again the author affirms that he could determine no causal connexion between malaria and avitaminosis C. The significance of the vitamin lies in the bringing about improvement in the convalescent stage and in enhancing the value of iron. The combination of iron (10 pills of Ferrostabul daily) with ascorbic acid (0.5 gm. as Cantin (ebion R doxon) or in the form of ascorbic acid iron (Ferro 66) was given with much success in malarial anaemia.

The author lays stress on a fact which is obvious from the foregoing, that this has nothing to do with the proper treatment of the malaria itself by quinine, atabrin, plasmoquine etc., but that together with this specific therapy more vitamin C is called for either by adding the vitamin itself or by giving a diet rich in this vitamin.

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MEYER (W.) Die Malaria als Volkskrankheit im europäischen Rußland und ihre Bekämpfung. [Malaria and its Control in European Russia.] —*Deutsche Trop. Zeitsch.* 1941 July 1 Vol 46 No 13 pp 239-53 [1 refs.]

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V B Higglesworth

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circle with a radius 1.25 feet the chord measuring 2 feet and the arc 2.5 feet the depth of this invert is six inches. A slab thickness of 2 to 2½ inches is the minimum which should be employed.

The advantages and disadvantage of each method of construction are discussed at length. Even the poorest of ditch linings are giving good service and apparently will continue to do so for a considerable period of time.

The paper is concerned exclusively with the engineering aspects of this important mosquito control measure. Norman White

DAVID (W. A. L.) Simple Tests for estimating the Suitability of Mineral Oils as Mosquito Larvicides—*Bull Entom Res* 1942 Sept Vol 33 Pt 3 pp 195-203

This paper should prove very helpful to those who have to judge the suitability of a larvicidal oil or to prepare a suitable blend of oils without access to a well-equipped laboratory. The author lays down a specification under the following heading: specific gravity (should not exceed 0.950 at 15°C/4°C) volatility (not more than 5 per cent should distil over at 200°C) viscosity (not greater than 5° sec Redwood I at 70°F) spreading pressure (not less than 16 dynes per cm) permanence of film (should remain uniform and unbroken for at least two hours) toxicity test (at least 50 per cent *Aedes aegypti* larvae or 90 per cent *Anopheles maculipennis* larvae should be killed when exposed under a film 10μ thick for half an hour at 25°C and then kept in clean water for 24 hours). A simple procedure for testing all these points with the minimum of apparatus is set out in detail. It is not possible to summarize this usefully. There follow two appendices: one on the procedure to adopt in blending larvicides that is the choosing of suitable kerosene, diesel oil and fuel oils and deciding what proportions of each to employ; and lastly an appendix which reviews briefly the nature of petroleum products for the benefit of those quite unfamiliar with petroleum technology. I. B. H. Westworth

HOWARD (Ralph S.) Jr. & ANDREWS (Justin) Studies on the Concentration and Distribution of Paris Green Lime Mixtures Applied as Anopheline Larvicides—*Amer J Trop Med* 1942 May Vol 22 No 3 pp 283-293 With 2 figs & 1 chart

In the experiments described, high calcium air-floated chemical hydrated lime was used as the diluent of Paris green and the mixture was distributed by a hand-operated duster of the rotary fan blower type and by a power duster driven by a truck motor. It was found that Paris green settles out faster and at shorter distance from the duster than does the lime. The extent of the visible dust cloud is therefore no measure of the surface of the water being treated with the larvicide. With the hand blower high mortality of the larvae was restricted to some 200 feet from the duster though the dust cloud could be seen extending to double that distance. With power dusters the larvicidal range is very much greater but is still not coextensive with the limits of the visible dust cloud. The observations indicate the desirability of having a diluent whose density and behaviour in aerial suspension are more nearly akin to those of Paris green than lime. Pure Paris green would be difficult to apply uniformly at a pound or less an acre. Regular coverage is difficult to obtain with less than three pounds of dust per acre. Norman White

HINMAN (E Harold) CROWELL (R L) & HURLBUT (Herbert S)
 Studies on Copper Arsenite a New Anopheline Larvicide — *Inter
 Jl Trop Med* 1942 May Vol 22 No 3 pp 271-281

Larvicidal dusting by aeroplane has been extensively used in the Tennessee Valley Authority's malaria control programme. Cost records during 1937 showed that the average cost of application per acre was 37 cents of which nearly two thirds was the cost of Paris green. This prompted endeavours to find a cheaper and more effective larvicide than Paris green. This paper describes the work that has been done to this end. Laboratory experiments were made comparing the larvicidal action of a large number of arsenites of different metals. These showed that copper arsenite has a marked superiority over Paris green notably for first instar anopheline larvae. A sufficient quantity of this was manufactured for field testing by aeroplane dusting. These field experiments showed that copper arsenite is at least as efficient as Paris green in spite of the fact that only a small proportion of the arsenite dropped reached the water surface. Laboratory experiments showed that the size of the particles of the larvicide is of importance. particles which average 5 or 15 microns in diameter are more efficient than particles averaging 25 microns. The copper arsenite used in the field experiments was of uniformly fine particle size. this may in part explain the favourable results obtained. Both Paris green and copper arsenite may be diluted 1 : 19 with sorpstone without loss of larvicidal efficiency.
 Norman Wolfe

BISHOP (Ann) Chemotherapy and Avian Malaria — *Parasitology*
 1942 May Vol 34 No 1 pp 1-54 [186 refs]

Of recent years avian malaria has occupied an important place in investigations on malaria. Not the least of these has been the part played by it in the establishment of the comparative therapeutic value of the various alkaloids obtainable from cinchona bark and the search for new antimalarial remedies. Already several important discoveries have been made and atebain and plasmoquine stand out as the principal additions to our remedies against malaria. So far no true prophylactic has been discovered but investigations directed to this end are constantly in progress. In this most interesting paper the author traces step by step the part played by avian malaria in these developments. She discusses the technique employed and evaluates the results obtained. The whole is a valuable summary of our knowledge of this most important subject and every investigator in this field should make a point of carefully studying it.

C M Henyon

RUSSELL (Paul F) & MOHAN (Badri Nath) Some Mosquito Hosts to Avian Plasmodia with Special Reference to *Plasmodium gallinaceum* — *Jl Parasitology* 1942 Apr Vol 28 No 2 pp 127-129 [11 refs]

TRYPANOSOMIASIS

CAMPOUFÉY P. *Recherches sur l'infection de Glossina palpalis par Trypanosoma gambiense au Cameroun* [Investigations on the Infection of *G. palpalis* with *T. gambiense* in the Cameroons]—*Rev. Sci. Méd. Pharm. et Nat. de l'Afrique Française* Libreville Brazzaville 1942 July Vol 1 No 1 pp 59-75 With 7 figs

An account is given of the results of recent survey carried out in the French Cameroon with the object of determining the incidence of human trypanosomiasis with special reference to the infection rate of tsetse (*G. palpalis*) in the endemic areas.

In the neighbourhood of Yaoundé out of 200 flies 13 (2.6 per cent) proved to be infected, only two showing trypanosomes in the salivary glands. In Leboudi, Ahalla, Ndimelong and Nkolboulon 9440 native were examined and 518 found infected. The total number of flies examined in the area was 66631 (4.6 per cent) of which including four with gland infections were positive. Sleeping sickness was also reported from other districts (Lebanzip, Fok, Obal) but no infected flies could be found there. The surveys have thus established an extremely low infection rate in the sector.

The author describes a simplified method of dissection of tsetse flies for the detection of trypanosome. The proboscis is first removed with a needle inserted into the bulb. The fly is placed on its back and two lateral incisions are made at the junction of thorax and abdomen. With one needle resting on the thorax and a second one on the abdomen the parts are drawn 1 cm apart. This operation exposes the salivary glands and gut. The glands are then removed with a needle, a portion of the gut is excised and both are examined microscopically. For more rapid diagnosis the abdomen is simply cut in two and mears are made with the exposed intestinal contents.

C 4 Hcare

TROLLI (G.) & VAN WYTHEESCH. La trypanosomiose humaine au Gabon et au Kwango. Diagnostic par l'examen du sang en goutte épaisse colorée. [Human Trypanosomiasis in Gabon and Kwango. Diagnosis by Stained Thick Blood Film]—*Ann. Soc. Bel. de Méd. Trop.* 1941 Sept 30 Vol 21 No 3 pp 231-259 1 refs

The authors claim that the examination of blood by the Giemsa stained thick drop is a more accurate method of detecting *T. gambiense* infection than that of gland puncture. It has in addition the advantage of allowing examination of slide at leisure and gives information about the malaria parasite rate. They support this contention by the following figures. Out of 8416 natives examined 570 were found to be infected by trypanosomes. Of the 211 were diagnosed by gland puncture alone, 276 by the thick drop alone, 80 were positive by both methods, and also 1 by lumbar puncture and 1 by blood culture.

In one region, the so-called Channel of the Congo River above Stanley Pool where the infection was apparently recent, 31 subjects were positive to gland puncture while 83 showed trypanosomes by the thick drop method.

It is claimed that at least 50 per cent of the cases with positive gland puncture show positive bloods so that more than twice as many positives are diagnosed by a single blood test than by a single gland puncture

In the discussion RODHAIN pointed out that this method may be more accurate in epidemics but that a single blood test may only reveal two thirds of the actual positive cases C C Chesterman

DAVID & PAPP Deux cas d'hérédité trypanosomique [Two Cases of Hereditary Trypanosomiasis]—*Rev Sci Med Pharm et Vet de l'Afrique Française Libre* Brazzaville 1942 July Vol 1 No 1 pp 92-94

The authors record from the French Cameroons two cases of congenital trypanosomiasis said to be the first in which transplacental transmission has been established beyond doubt In both cases the mothers (native women) were in excellent health and showed no evidence of trypanosomiasis before parturition Immediately after delivery routine examinations of the blood revealed the presence of trypanosomes in the peripheral circulation of the mothers and of the two infants as well as in the umbilical cords The trypanosomes persisted in the mothers and infants for a period of one week in one case and a fortnight in the other after which the patients underwent treatment resulting in the disappearance of the trypanosome All the available evidence in these cases seemed to point to transplacental transmission of the infection C A Hoare

IULTON (J D) & YORKE (Warrington) Studies in Chemotherapy XXX—The Trypanocidal Action of Additional Aromatic Diamidines—*Ann Trop Med & Parasit* 1942 Sept 30 Vol 36 No 3 pp 131-133

A description is given of the therapeutic action of various new aromatic diamidine compounds on infections of mice by *T. congolense* and *T. rhodesiense* The details of the two most active compounds are as follows—

(1) 4,4-diamidino monomethyl stilbene Maximum tolerated dose (intraperitoneal) per 20 gm mouse 1.0 mgm minimum effective dose 0.01 mgm and minimum curative dose 0.05 mgm for *T. rhodesiense* infections M.E.D. 0.5 mgm and M.C.D. 1.0 mgm for *T. congolense* infections

(2) 4,4-diamidino dimethyl stilbene M.T.D. 1.0 mgm M.E.D. 0.025 mgm (0.05 mgm cured 5 out of 10 mice) for *T. rhodesiense* infections and M.E.D. 0.1 mgm and M.C.D. 0.25 to 0.5 mgm for *T. congolense* infections

The compounds were not active against *T. cruzi* infection of mice F Hawkin

DUBOIS (A) & KOHN (I) Infectiosité de trypanosomes au cours des traitements chimiothérapiques [Infectivity of Trypanosomes during Chemotherapeutic Treatment]—*Ann Soc Belge de Med Trop* 1940 June 30 Vol 20 No 2 pp 173-178

Mice infected with *T. brucei* were treated with various drugs and before the trypanosomes had disappeared from the blood inoculations

were made into other mice. Trypanosomes thus exposed to suramin (Bayer 205) failed to infect fresh animal. Those exposed to neocarphenamine or to novoflavine (Paciflavine) often failed to infect. Those exposed to tartar emetic, tryparsamide or human serum always infected. The authors draw no conclusion from these observations.

The power of suramin to render trypanosomes non-infective is well known although they are not killed by it *in vitro*. In the case of the other compounds the authors' observations presumably relate to the short period which elapses between fixation by the parasite of a lethal dose of the drug and their actual death.


F. Harkin

KING (Harold) & STRANGEWAYS (Winifred I.) Some Observations on the Relation between Chemical Structure and Drug Resistance among Arsenicals — *Ann Trop Med & Parasit* 1942 June 30 Vol 36 No 1 & 2 pp 47-53 17 refs

This paper describes a study of the relations between the chemical structure of various trivalent arsenical compounds and their action *in vitro* upon normal and tryparamide-resistant trypanosomes (*T. rhodesiensis*). According to their actions the compounds can be divided into three classes —

(1) Those which contain solubilizing carboxyl group and form neutral sodium salt with a great affinity for water e.g. 4-carboxy phenyl arsenoxide. These compounds are of low toxicity to the trypanosomes, normal and resistant (the dilution fatal in 6 hours is 1 in 800 000) and it is considered that these compounds enter the trypanosomes in the same way as glucose and salt. This class includes the arsenoxide corresponding to arsenophenyl glycine and therefore there is no need to postulate special acetico-receptors to account for the abnormal behaviour of this compound.

(2) Those which are devoid of hydrophilic group apart from the arsenoxide group e.g. phenyl arsenoxide and vinyl arsenoxide. They are actively trypanocidal for both normal and resistant trypanosomes (the dilution of phenyl arsenoxide fatal in 6 hours is 1 in 320 000 000 to 1 in 640 000 000). It is believed that these substances are taken up at some lipid-water interface so that the phenyl group is in the lipid phase and the arsenoxide group at the water interface.

(3) Those substances which act on resistant trypanosomes much less readily than on normal ones e.g. thioarsenite derivatives of tryparsamide arsenoxide of which the lethal dilution at 6 hours is 1 in 13 000 000 for normal and 1 in 400 000 for resistant trypanosomes. These compounds are taken up by the same group in the parasite as those which take up oxazine and acridine dyes but the nature of these groups is obscure. It appears that both ends of the molecule are involved in the primary fixation which occurs since phenyl *pp* diarsenoxide OAs  OAs(c1ccccc1)As(=O)(O)c2ccccc2 belongs to this third class and not to the second.

It must be understood that this division of the substance into three classes and the hypotheses concerning their mode of entry into the trypanosome refer only to the primary fixation of the compound by the organism. The later stages by which the compound causes death of the trypanosome are unknown although possibly SH group may be involved.

F. Harkin

COLLIER (H O J) FULTON (J D) & INNES (J R M) The Oedema of Mice Infected with *Trypanosoma cruzi* and the Accompanying Pathological Lesions—*Ann Trop Med & Parasit* 1942 Sept 30 Vol 36 No 3 pp 137-150 With 1 chart & 12 figs on 2 plates [26 refs]

This is the most complete account of the pathology of experimental American trypanosomiasis known to the abstractor and as aiding in explaining the clinical symptoms in man deserves a full description.

The authors set out to study and if possible to solve two main problems (1) The widespread oedema (Chagas's myxoedema) occurring in this disease (2) Comparison of the pathology of experimental infection of mice with *T. cruzi* with that of the natural disease in man and of other forms of trypanosomiasis in man and lower animals. Further questions arising from the former of these were (i) What relation if any is there between this oedema and disturbance of the thyroid gland? (ii) Is it peculiar to mice or does it occur in other animals infected experimentally? (iii) Is it localized and related to the site of inoculation?

Previous experimental work has been mostly in connexion with the virulence of the trypanosome its infectivity and mode of transmission. From the pathological aspect several writers CROWELL DE COURSEY JOHNSON and DE RIVAS and LEBENBERG among others have concluded that the presence of the trypanosome evokes an exudative inflammation followed later in the more chronic stages by proliferative changes.

The authors have inoculated more than 250 mice in the course of their investigations and examinations were carried out at different intervals after inoculation—when the blood infection was at its acme and before during and after development of the oedema. The results are classified in four stages (1) A negative blood phase (after intravenous inoculation the parasites are found immediately the negative phase refers to inoculation by other routes) (2) Progressive infection (3) Acute pathological changes taking place (4) Fading blood infection. The oedema occurs in the third of these about the 15th day and extends over the neck chest and abdomen is of a clear gelatinous type spreading along the fascial planes into the upper limb muscles and around the cervical axillary and iliac lymph nodes which are much swollen. The exudate from the deposit may contain more trypanosomes than are seen in the peripheral blood the spleen is enlarged and engorged the liver shows little change the kidneys alimentary tract and genitalia nothing abnormal in particular the thyroid microscopically as well as macroscopically appears to be normal. Mice not exhibiting this oedema showed the other changes described so the difference is probably one of degree only.

Histologically the oedema is seen to separate the dermis from the muscular layers of the skin the subcutaneous tissue is of loose areolar structure the spaces of which are occupied by gelatinous transudate the cells are mainly lymphocytes and large swollen histiocytes. The lymph nodes show proliferation and shedding of the cells lining the sinuses these are distended by masses of free histiocytes which may obstruct the flow of lymph and lead to the production of small medullary cysts. Necrosis and haemorrhage are absent. The oedema spreads through and separates the voluntary muscle fibres the fibres themselves showing loss of striation and poor staining. Parasites may

be numerous in the fibres and there may be some inflammatory reaction. In other places the parasites did not seem to evoke any such reaction. The myocardium showed similar changes to those of the voluntary muscles, particularly in the atria, the atrio-ventricular junction, base of the ventricles and the walls of the large veins. Other viscera showed no marked alterations from the normal. Mice which had lived for 6-12 weeks and in which the oedema had passed away showed none of the acute changes as seen previously in the muscles and heart, but residual scars and areas of calcification. In those hosts the acute changes led to manifold forms of the parasite could be seen in heart, spleen (scanty), liver, pancreas, kidney (scanty), testis, skeletal muscles, tongue, salivary gland, lymph nodes, skin and subcutaneous tissue of the thyroid; therefore the oedema is not a myxoedema, but comparable rather with an inflammatory oedema which is met with in bacterial, viral and protozoal conditions other than trypanosomal.

As regards the second main question, the oedema does not occur even in the other trypanosomal infections of mice, such as with *T. amurensis* and *T. o. olense*, nor did adult rat, hamster, guinea pig, monkey, rabbit and other laboratory animals show the oedema even after inoculation with *T. cruzi*.

Transient oedema are well known as occurring in the early stages of African trypanosomiasis of man and animal and in urticarial mal de cadavre, but *T. cruzi* infection produces the oedema which is the subject of this paper only in those animals to which the protozoon is truly pathogenic, namely man, dog and mouse. *H. H. Old Scott*

Mazza (Valador) Basso (Germinal) & Basso (Redento). Investigaciones sobre enfermedad de Chagas. Ensayos terapéuticos del producto 9736 (A.) Bayer y de su acción comparada con el 7602 (Ac) Bayer en la enfermedad de Chagas. Chagas's Disease Treatment with 9736 (As) Bayer compared with 7602 (Ac). *Unidad Biológica* 4 (es). *Visitas de Estudios de Patología R. a. 4 (es)*. (Jujuy). *Publicacion No 61*. 1942. 76 pp. With 60 figs.

Bayer 7602 (Ac) has been used in treating cases of Chagas's disease for the past five years with good success. It is injected intramuscularly. In some patients the injections cause much pain and in some the onset of albuminuria necessitates stopping the treatment for a time and then re-urining with reduced doses. In 1940 Bayer produced another arsenical denominated 9736 (A.) which contains 22 per cent arsenic and 5 per cent sulphur and is used in 10 per cent solution intravenously. It is less toxic and better tolerated than 7602. The usual dose is 1 cc (0.15 gm) for adults (less for children and debilitated subjects) increasing to 3-4 and even to 4-5 cc twice or thrice weekly to a maximum total of 10 cc (1.5 gm) for men, 40 cc for women and 30 cc for children.

Four cases are recorded with Professor Mazza's usual wealth of detail. Two were women of 16 years treated with 7602 (Ac) and two women of 29 and 15 years who received the new drug. The latter tolerated the drug well but the 7602 is more effective and more rapid in action. The new preparation has, however, the advantage of acting also on other trypanosomes—*T. l. cruzi*, *T. gambiense*, *T. rhodesiense*, *T. congoense*.

T. evansi and *T. equinum* at least in experimental infections whereas 7602 (Ac) is trypanocidal in the case of *T. cruzi* only

H Harold Scott

LEISHMANIASIS

BOIX BARRIOS (Jose) Epidemiologia del kala azar infantil [Epidemiology of Infantile Kala Azar]—*Medicina Española* Valencia 1942 Mar & Apr Vol 7 Nos 38 & 39 pp 220-231 352-362 With 3 maps & 1 chart

This is a general account of infantile kala azar having special reference to cases which have been observed in Spain where the disease is most prevalent on the Mediterranean coast and in and around Madrid. In one coastal province Castellón 507 cases have been reported while in the province of Madrid 132 cases have been noted. The incidence of the disease as regards age sex seasonal occurrence and other features is characteristic of Mediterranean kala azar. It is admitted that of domestic animals dogs are the most important reservoirs but attention is called to the observation of BENAVENTE that there is some association between outbreaks of illness amongst fowls and the occurrence of human cases. [No one however has yet been able to show that fowls are liable to leishmanian infection]

C M Wenyon

INDIAN MEDICAL GAZETTE 1942 Aug Vol 77 No 8 pp 483-485
—The Transmission of Kala Azar

FULTON (J D) & YORKE (Warrington) Studies in Chemotherapy XXXI.—The Increased Toxicity of Old Solutions of Stilbamidine—*Ann Trop Med & Parasit* 1942 Sept 30 Vol 36 No 3 pp 134-137

Experiences in the laboratory at Liverpool and in the hospital of the Sudan suggested that solutions of stilbamidine (4:4 diamidino stilbene) might become more toxic on ageing.

This compound was originally issued as the dihydrochloride but recently this has been replaced by the diisethionate salt which is much more soluble. Experiments were made to determine the toxicity for mice of a single dose given intraperitoneally. No change was produced by heating the solution to 60 C for 5 minutes by boiling for two minutes or by keeping at 15-20 C or for 14 days in the dark. But if the solutions were exposed to sunlight on the window sill [the atmosphere of Liverpool is smoky] for two days the solution became slightly yellow and the toxicity was considerably increased for instance the MTD of the diisethionate was reduced from 2 mgm per 20 gm mouse to about 0.25 mgm and that of the dihydrochloride from 1 mgm to less than 0.25 mgm. If the exposure to sunlight was prolonged for more than 14 days no further increase of toxicity occurred. The mice which died usually did so within a few minutes after the intraperitoneal injection their death may have been due to fall of blood pressure which is known to occur after the injection of diamidines. On the other hand the toxic symptoms in patients in the Sudan did not develop for some time after the completion of the

course and they suggested degeneration of the liver and possibly of other organs resulting from a cumulative toxic action of the drug. These compounds are known to cause fatty degeneration of the liver in dogs and cattle and peculiar nervous symptoms have been produced in dogs. Owing to the different symptoms observed in mice and in man or large animals it is not yet certain whether the increased toxicity of old solutions for the latter is also due to changes produced by light. The chief practical conclusion to be drawn from this work is that during the treatment of man or animals only freshly prepared solutions should be used.

[SMILES and the reviewer (this Bulletin 1942 Vol 39 p 238) found that solutions of diamidino stilbene are strongly fluorescent when exposed to ultraviolet light. On continued exposure the brilliance of the fluorescence gradually diminishes. Thus it is clear that the compound absorbs energy from the rays of light and that it undergoes some molecular change as a result.]

J. HAWKIN

LATYSHEV (N. I.) & KRUKOVA (A. P.). On the Epidemiology of the Cutaneous Leishmaniasis. The Cutaneous Leishmaniasis as a Zoonotic Disease of Wild Rodents in Turkmenia.—*Travaux Acad. Milit. Med. Armée I. et U. P. S. S. S. Moscow 1941 Vol 25* [In Russian pp 229-241. With 12 fig. (2 on 1 plate). English summary pp 241-242.]

The authors have found that in the sand desert conditions of the investigated regions of Turkmenia (alley of the Murgab River) the burrows of wild rodents appear to be breeding places for *Phlebotomus*. Determining the great susceptibility of *Rhombomys opimus* to the infection with *L. tropica* taken from man's ulcers within a very short period of incubation (from 7-1 days) the authors have carried out a wide investigation of these rodents searching for a spontaneous infection in them.

The searches have proved successful: on the average 30 per cent of 1087 animals have been found to be spontaneously infected with leishmaniasis, the number of infected animals increasing during the season from 23 per cent in May to 56.3 per cent in November-December. The clinical findings of the infection in rodents have already been described.

The identity of the parasite of *Rhombomys* with that of human *L. tropica* is proved by the inoculation of the virus from the animal to man: after the incubation period of 15 days in the places of the inoculation typical ulcers appeared swarming with parasites. The leishmaniasis has also been found in *Meriones erythronus* and *Spermophilopsis leptodactylus* the typical representatives of the sand desert fauna.

The authors have come to the conclusion that cutaneous leishmaniasis is a typical zoonotic disease and that rodents should be considered to be the reservoirs of *Leishmania tropica* spread by *Phlebotomus* as transmitter.

The authors consider that the best method for eradicating cutaneous leishmaniasis is poisoning of burrows with chlorpicrine.

The authors have had one locality put to test with 70 per cent of the population infected but the results could not be recorded in the same season as the test was started too late.

- SMITH (J Ferguson) Late Cutaneous Recurrence of South American Leishmaniasis after Treatment with Antimony—*Brit Jl Dermat & Syph* 1942 Aug-Sept Vol 54 Nos 8-9 pp 231-234 With 1 fig

The paper discusses the case of a seaman who developed extensive ulceration on the inner aspect of both legs after an insect bite on the left leg when on board ship in the River Plate off Rosario. It seemed probable that the condition was leishmaniasis though the most careful search failed to reveal any leishmania. Complete healing however followed courses of tartar emetic and neostibosan. Eight years later a small nodule appeared on the outer aspect of the right leg. This increased in size during the next few months and finally ulceration occurred. Again undoubted leishmania were not found and again courses of tartar emetic and neostibosan cured the condition. The case is evidently one of relapse for the patient had not been abroad in the interval but whether it was leishmaniasis or not must remain doubtful in view of the complete failure to demonstrate the parasite in material from the lesions. C. M. Wenyon

- SIMONETTI (G) Rontgenterapia della leishmaniosi cutanea [X Ray Treatment of Oriental Sore]—*Boll d Soc Italiana di Med e Igiene Trop* (Sez Eritrea) Asmara 1942 Vol 1 No 2 pp 25-26 English summary (3 lines)

A single case successfully treated

C IV

- IRIARTE (David R) Leishmaniosis [Leishmaniasis]—*Bol d Lab Clin Luis Raelli* 1942 June Vol 2 No 8 pp 141-145 With 4 figs

A record of a case in Venezuela

C II

FEVERS OF THE TYPHUS GROUP AND OTHER FEVERS

- PINKERTON (Henry) The Pathogenic Rickettsiae with Particular Reference to their Nature Biologic Properties and Classification—*Bact Reviews* 1942 Mar Vol 6 No 1 pp 37-78 [133 refs]

This paper is really a valuable monograph dealing with certain aspects of the bacteriology of the pathogenic Rickettsiae. It includes a list of 133 references to the literature but this hardly does justice to the French workers on the subject. Apart from the great value of the systematic review that is given of the work of other observers the article is of special interest because of the opinions expressed by the author on certain controversial matters.

The Rickettsia of murine flea borne typhus is regarded as a variety of *Rickettsia prowazeki* and is called *R. prowazeki* (var *mooseri*). From the practical point of view its most important distinguishing feature is that it grows much more luxuriantly in experimental animals and in media containing living cells and so lends itself more readily to the preparation of vaccines than *R. prowazeki* of the classical type. Both varieties of *R. prowazeki* retain their special features in a constant manner nobody has succeeded in changing one variety

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and pathological aspects to typhus and the other fevers which are commonly regarded as belonging to the typhus group. The reviewer does not pretend to have given an adequate account of this very interesting paper which itself is a highly condensed abstract of a large number of important contributions to the literature of the subject.]

John W. D. Megaw

MEGAW (J. W. D.) Louse borne Typhus Fever — *Brit Med JI* 1942 Oct 3 & 10 pp 401-403 433-435 With 1 chart

In this account of what probably is and certainly may become one of the most devastating diseases of the war especially in Eastern Europe and North Africa the reader will find a concise and well informed description. All aspects of the disease are dealt with but the author has laid special stress upon the clinical features and the methods of diagnosis. He has brought together much recent information on prevention including the methods of immunization and treatment. In conclusion he gives an account of the other fevers of the typhus group [perhaps Q fever of Australia and Montana a Rickettsial disease transmitted by ticks should now be included with Rocky Mountain fever and other allied diseases as a member of this group.]

The paper cannot further be abstracted but should be read with attention by all who may come into contact with the disease. C. W.

ZIMMERMAN (E.) Zur Epidemiologie des Fleckfiebers im Generalgouvernement [The Epidemiology of Typhus Fever in German Occupied Poland] — *Ztschr f Hyg u Infektionskr* 1942 Mar 16 Vol 123 No 5 pp 552-557

In Poland the disease is now assuming the form of a war epidemic though on a smaller scale than was generally expected.

In 1919 44 000 cases were reported in Poland the number fell steadily to 320 in 1930 and since that year the cases have fluctuated between 420 and 1 000 till 1938. No figures are available for 1939. In 1940 7 900 cases were reported but there must also have been many mild attacks which were not included in the figures.

The author states that 67 893 persons were inoculated with Weigl's vaccine between 1930 and 1938.

About 70 to 80 per cent of the cases in 1940 were in Jews [this is not surprising in view of the conditions to which they were subjected]. The case mortality rate was only 5.6 it ranged from nil in persons under 16 years of age to more than 30 per cent in persons over 35. It was as high in Jews as in the rest of the community.

More than half of the persons attacked were young the incidence was highest in the 16 to 20 age group in which nearly a quarter of all the cases occurred.

In the early winter of 1939-40 there were only a few sporadic cases but after the new year cases began to appear in a number of widely separated towns between which there was little chance of communication. It is suggested that the most likely reservoir of infection was in clothing infected by dried louse faeces in which the virus can survive for months. The disease soon began to spread rapidly in the large towns infection was probably conveyed by beggars and tramps chiefly Jews who were hounded from place to place. The worst outbreaks were in places where the Jews were herded together sometimes with only three to four square metres of floor space for each person. In April and May the incidence became less in the towns but the disease

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pread among the peasantry in isolated houses and small centres of population. In the second half of June the epidemic suddenly subsided in the usual way. During the summer months there were only a few isolated cases but in November the cold season rise made its appearance.

John H. D. McEwen

LÖFFLER (W.) & MOOSER (H.) Zum Übertragungsmodus des Fleckfiebers. Beobachtungen anlässlich einer Laboratoriums-Cruppeninfektion. The Modes of Transmission of the Typhus Fevers.—*Schweiz. Med. Hoch.* 1942, July 11, Vol. 7, No. 28, pp. 757-761. With 6 figs. '33 r f.)

This important paper consists of two parts: the first contains a valuable and fully documented account of the evidence which bears on the mode of transmission of house-borne and flea-borne typhus fever. This in itself is a condensed summary to which justice cannot be done in an abstract but it will be found very useful by all workers on the typhus fevers. Among the many matters dealt with special mention is made of the work of ARKWRIGHT and BACOT who showed that the salivary gland of the centurion *Rickettsia* so that these insects can hardly transmit the virus directly by the mere act of biting. The possible modes of transmission of typhus virus in natural conditions are: (1) The *Rickettsia* contained in the faeces and crushed bodies of lice may enter through scratches of the skin; (2) the *Rickettsia* may be introduced by the human apparatus which has been soiled with infected faeces of the louse; (3) *Rickettsia* contained in the faeces of lice may be introduced into the conjunctiva by hairs which have been soiled through crushing the insect; and (4) dust particles resulting from the drying of the faeces of infected lice may be inhaled.

Mooser and his colleagues have shown that lice cannot become infected by biting persons who have inapparent attacks so that infection cannot be carried over from one outbreak to another by the inapparent cases. BLANC believes that infected louse faeces constitute the reservoir of infection in inter-epidemic periods. It must be assumed that clothing discarded in the summer can harbour the virus in the dried faeces of the lice; that the faeces remain virulent and can afterward infect susceptible persons through the respiratory tract. Louse transmission would then begin again. Another possibility is that murine *Rickettsia* harboured by rats and transmitted from them to human beings by rat flea may then be transmissible by human lice and so give rise to epidemic typhus fever. Human fleas are also regarded as possible reservoirs of the virus of human typhus.

The mode of infection in laboratory workers who have been handling the *Rickettsia* of murine and classical typhus is not altogether clear. Lice must be responsible in the cases in which they alone are being used in the preparation of vaccines but cases also occur in laboratories in which lice are not used but only experimental animals. NICOLLI believed that fleas on these animals were responsible whereas Mooser held that *Rickettsia* from the infected animal entered the body through the skin. More recently special attention has been paid to the possibility of infection through the conjunctiva and nasal passages. Infinitesimal quantities of louse faeces can convey the infective dose as is shown by SPARROW'S findings that the intestine of an infected mouse may contain up to 1,000 million infecting doses for the rat. CULCA has reported a case of laboratory infection with classical typhus in the

absence of lice in this case mice were being inoculated by the intranasal route. These observations support MURCHISON'S view that typhus was highly contagious.

Most epidemiologists maintain that head lice play no part in the transmission of infection they are certainly wrong because one of the present authors has repeatedly found infected head lice on patients. The faeces of these insects must be highly infectious so that when the louse infested mane of a convalescent is shaken there are great opportunities for the scattering of infected dust.

In the second part of the paper details are given of six cases of laboratory infection caused by a Mexican murine strain of virus which had been isolated from a patient more than five years previously. The strain had been maintained in guineapigs and had fully maintained its original characteristics. A laboratory attendant had a severe attack of typical typhus fever shortly after the commencement of work on this strain in the course of which rats and mice were inoculated by the nasal route with emulsions of pneumonic lungs. Shortly afterwards three workers who had carried out similar nasal inoculations on 60 mice within half an hour were all attacked within a few days in spite of having worn rubber gloves and blouses as well as gas masks during the operation though immediately afterwards they had discarded the masks and remained in the same room. Two female laboratory assistants were also attacked though one of them had taken no part in the experimental work and had only come into the room for a few moments shortly after the inoculations had been performed the other was engaged in feeding the inoculated mice and had on one occasion been in the same room soon after the end of the operation.

The former of these two female patients could not possibly have been infected in any other way than by the inhalation of infected particles sprayed into the air during the explosive expiratory efforts of the mice and the other persons were probably infected in the same way. Inhalation infection can happen all the more readily because the epithelial cells of the respiratory tract are known to be specially suitable for the development of the Rickettsiae. A conspicuous feature of the onset of all the attacks was an influenza like catarrh of the lower air passages this suggests a local reaction at the site of entry of the virus. There is no question of the spread of infection from one person to another by droplet infection the air passages lend themselves to the entry of the Rickettsiae but not to their discharge from an infected person.

One of the patients had been given two doses of vaccine made from the strain that caused her attack the first dose was given 10 days and the second two days before the onset. The attack was exceptionally mild and lasted only eight days. Reference is made to a seventh case not included in the series the patient had suffered from typhus fever 14 years previously and his only symptoms were slight fever headache and lassitude lasting three days.

In all laboratories in which work is done with typhus Rickettsiae the workers are very liable to be attacked usually to the extent of 100 per cent of the personnel in spite of previous inoculation so that the vaccine cannot completely protect against the intense infection by the respiratory route that occurs in these cases though it greatly reduces the severity of the attacks. A definite recommendation is made that persons engaged in disinfestation work should be protected not only by inoculation and by wearing louse proof clothing but

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Johannes

LOFFLER (W.) & MOOSER (H.) Zum Übertragungsmodus des Typhus. Beobachtung, anlässlich einer Laboratoriumsinfektion. The Modes of Transmission of the Typhus. *Schweiz. Med. Hoch.* 1942. July 11. Vol. 72. No. 761. With 6 figs. (33 ref.)

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Mooser and his colleague have shown that typhus is not transmitted by biting persons who have an inapparent infection cannot be carried over from one person to another. These inapparent cases BLANC believes still constitute the reservoir of infection in nature. It must be assumed that clothing discarded in the house contains the virus in the dried faeces of the lice that can be inhaled and can afterwards infect susceptible persons. Thus louse transmission would then be the most important. That murine Rickettsiae harbor in them to human beings by rat fleas, human lice and so give rise to epidemic typhus are also regarded as possible reservoirs.

The mode of infection in laboratory typhus. The Rickettsiae of murine and Chinese typhus must be responsible in the case of infection in the preparation of vaccines. It is believed that fleas on these animals are not held that Rickettsiae from the skin. More recently the possibility of infection through infinitesimal quantities of louse excreta is shown by STARR and his findings. It may contain up to 1,000 million Rickettsiae. He reported a case of laboratory typhus.

Great care must be taken in looking for spots which appear on the 3rd-6th day and last for about 10 days as they may be only few in number and may not appear on the face. The Weil Felix reaction usually becomes positive on the 5th day and increases thereafter but 20 per cent of the cases do not agglutinate till the 15th-20th day and even indeed not at all. A titre of 1/100 is very significant. The existence of pneumonia is shown by the infiltration blood stained sputum rigors which are seldom seen in uncomplicated typhus and leucocytosis whereas in typhus there is a leucopenia of about 6000 [sic] in typhoid the rise of the fever is slower the patient indeed being uncertain when the disease started while in typhus the day and hour can be given accurately. The enlarged spleen is harder the brady cardia and leucopenia (1500-3000) more pronounced. The rash starts to appear from the 7th day and for a week or two new outbreaks occur and after 2-5 days disappear. The spots mostly appear on the trunk not more than 5-10 in number. In typhus they are raised larger and more numerous and occur on the extremities including even the hands where they are never seen in typhoid. They do not disappear on pressure since they are haemorrhagic. If there are only even a few eosinophils in the blood this is strong evidence against typhoid. Numbness and unrest at night are much more intense in typhus. The Widal agglutination is practically valueless in those who have been vaccinated. The same applies to paratyphoid which however has seldom so severe a course that it can be confused with typhus. Epidemic meningitis begins suddenly with rigor neck rigidity Kernig's sign and hyper sensitivity. The CSF is cloudy while it is clear in typhus and the cells are greatly increased (1000 per cubic millimetre) while in typhus they are normal or at most 200 per cubic millimetre. At the start typhus can resemble angina yet the throat symptoms are slight and the fever persistent. In influenza the fever falls by lysis in a few days although of course it often rises again tracheitis bronchitis cold in the head are prominent but there is no numbness. In bronchopneumonia it is often necessary to clinch the diagnosis by the Weil Felix reaction. Measles attacks the face. Inexplicably high fever in wounded and frostbitten patients must also indicate the possibility of typhus.

BURY (K. J.) Zur Fleckfiebertherapie mit Sulfonamiden [The Treatment of Typhus Fever by Sulphonamides]—*Klin. Woch.* 1942 Aug 8 Vol 21 No 32 pp 709-710 [14 refs.]

During the preceding eighteen months 254 cases of louse borne typhus were admitted to the State Hospital of Sosnowitz [in S.W. Poland]. Of these 51 were treated with various sulphonamides including sulphapyridine (Dagelan of French or Polish origin) prontosil sulphathiazole albucid and an experimental preparation.

Be 1034 (an azo sulphonamide compound made by Bayer). The last named drug seemed to have a definite action in reducing the severity though not the duration of the attacks the others had no significant action in fact the treated patients had a greater tendency than the controls to suffer from extremely low blood pressures. Secondary infections were less frequent and less severe in the treated cases so that the sulphonamides are recommended when these complications arise.

also by gas masks. The clinical feature of the six cases are given in detail all the patients independently thought at first that they had influenza and apart from the rash the symptoms were such as might occur in any severe febrile infection. The severity ranged from that of a severe attack of typhoid fever to an inapparent attack. The Weil-Felix reaction was positive in titre ranging from 1-100 (in the inoculated patient) to 1-10 000. In three cases the temperature fell temporarily almost or quite to normal soon after the onset thus showing Nicolle's croquet. A remittent type of temperature predominated in most of the cases and the fall was by gradually. In five there was a general tendency to leucopenia leucocytosis occurred in two cases in one due to pneumonia in the other to cystitis and phlebitis.

John H. D. McArthur

DONALD (C.) & BAIKER (P. B.) Louse-borne Typhus Fever—*Brit Med J* 1942 Sept 19 pp 333-335

This is an account of an outbreak of typhus which occurred in a prison camp some 100 miles here in Germany. There were 21 cases of which three were fatal. The nationality of the patients is not stated. 16 of them were employed in handling clothing at a camp disinfectory.

The onset in one case was like that of appendicitis and a laparotomy was performed. In five mild cases no rash was seen in four cases the rash extended to the face. The palms and soles appear to have been affected in all the cases in which the rash was visible. The fever lasted 17 days on the average it tended to terminate by gradually subsiding three or four days. After the fall of the temperature the patients were very emotional and continued to have bouts of delirium and transient delusion. There was marked dyspnoea with stertorous breathing and working of the alae nasi in all the patients. Cheyne-Stokes breathing was seen for a short time before the end of the fever. The blood pressure was normal except in one patient who had hypertension during early convalescence with a systolic reading of 180 to 190 mm. Hg persisted for six months and then disappeared. Several patients had diplopia. In a number of cases the symptom suggested epidemic encephalitis and in one of the fatal cases the post-mortem findings were of this type. There was initial polycythaemia followed by anaemia the haemoglobin and red blood corpuscles being reduced by 20 to 30 per cent after the appearance of the petechial rash. In one fatal case the leucocyte count on the fifth day was 4 400 in another on the seventh day it was 6 400.

The Weil-Felix reaction was positive in all the cases tested after the seventh day and negative in all those tested before the fifth day.

Sulphonamides antipyretic and hexamine were tried but all were useless. Fluids with glucose were given freely by the mouth and when necessary also by the rectum or intravenously up to five or six litres were given daily. Luminal and omnopon (scopolamine) controlled acute delirium and in omnia lumbar puncture relieved severe cerebral irritation. Tepid sponging was useful.

John H. D. McArthur

DENNIG [Differential Diagnosis of Typhus]—*Ztschr f. arzt. Forsch* 1942 No 9 Translation of abstract in *Ars Medica* 1942 Vol 32 No 7 p 340

At the peak of infection diagnosis can at once be clinched from the flushed face with conjunctivitis numbness, high fever and the pot

Great care must be taken in looking for spots which appear on the 3rd-6th day and last for about 10 days as they may be only few in number and may not appear on the face. The Weil-Felix reaction usually becomes positive on the 5th day and increases thereafter but 20 per cent of the cases do not agglutinate till the 15th-20th day and even indeed not at all. A titre of 1/100 is very significant. The existence of pneumonia is shown by the infiltration blood stained sputum rigors which are seldom seen in uncomplicated typhus and leucocytosis whereas in typhus there is a leucopenia of about 6 000 [sic] in typhoid the rise of the fever is slower the patient indeed being uncertain when the disease started while in typhus the day and hour can be given accurately. The enlarged spleen is harder the bradycardia and leucopenia (1500-3000) more pronounced. The rash starts to appear from the 7th day and for a week or two new outbreaks occur and after 2-5 days disappear. The spots mostly appear on the trunk not more than 5-10 in number. In typhus they are raised larger and more numerous and occur on the extremities including even the hands where they are never seen in typhoid. They do not disappear on pressure since they are haemorrhagic. If there are only even a few eosinophils in the blood this is strong evidence against typhoid. Numbness and unrest at night are much more intense in typhus. The Widal agglutination is practically valueless in those who have been vaccinated. The same applies to paratyphoid which however has seldom so severe a course that it can be confused with typhus. Epidemic meningitis begins suddenly with rigors neck rigidity Kernig's sign and hypersensitivity. The CSF is cloudy while it is clear in typhus and the cells are greatly increased (1 000 per cubic millimetre) while in typhus they are normal or at most 200 per cubic millimetre. At the start typhus can resemble angina yet the throat symptoms are slight and the fever persistent. In influenza the fever falls by lysis in a few days although of course it often rises again tracheitis bronchitis cold in the head are prominent but there is no numbness. In bronchopneumonia it is often necessary to clinch the diagnosis by the Weil-Felix reaction. Measles attacks the face. Inexplicably high fever in wounded and frostbitten patients must also indicate the possibility of typhus.

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Be 1034 (an azo sulphonamide compound made by Bayer). The last named drug seemed to have a definite action in reducing the severity though not the duration of the attacks the others had no significant action in fact the treated patients had a greater tendency than the controls to suffer from extremely low blood pressures. Secondary infections were less frequent and less severe in the treated cases so that the sulphonamides are recommended when these complications arise.

No details are given of the number of persons treated with each of the sulphonamides but care was taken to ensure that the patients in each group should be comparable in age, state of nutrition and severity of disease.

The drugs were given in full dose in courses not exceeding 14 days. Rectal administration was sometimes employed and albucid was given intravenously in some of the cases.

A summary is given of previous work dealing with trial of the sulphamide in Rickettsial infection. Reference is made to the successful use of sulphapyridine by MAGERL in trench fever (but as already pointed out Magerl's cases were probably not of trench fever. See this *Bulletin* 1942 Vol 39 p 154). Animal experiments have yielded conflicting results. TOPPING found that prontoil and sulphapyridine had a harmful effect on guinea-pig inoculated with *Rickettsia prowazekii* and *R. tickellii* whereas WOHLRAB found that mice infected with *R. prowazekii* suffered less severely when treated with sulphamylamide, diulphanilamide and a preparation with the formula 4-sulphonamide-4-diminoazobenzol-6-carbonic acid.

John H. D. Meade

STURM (A) *Neu Weg in der symptomatischen Malariaertherapie* [New Methods of Symptomatic Treatment of Typhus Fever]—*Muench Med Woch* 1942 Nr 1 Vol 89 No 34 pp 733-735 With 1 f.

A purely symptomatic treatment was adopted in 17 cases of typhus fever in soldiers aged from 20 to 44 years. Two of the patients died on the 10th and 15th day respectively. The author rightly apologizes for stating that the case mortality rate was 11.76 per cent. The average duration of the fever in the survivors was about 16 days. The temperature curves are shown. The condition in no way from type often seen in group of untreated cases so that it is not easy to accept the claim of the author that striking benefit resulted from the treatment. In the circumstance a detailed account of the elaborate system that was adopted need not be given.

To every patient the following drugs were given daily: AT 10, TC 6, diaphoretic, veritol, cebion forte and betaxin. In cases with low blood pressure, cardiazol, oramin and cortison were also given.

John H. D. Meade

WOHLRAB (R) *Malaria bekämpfend im Gefangenenelement* [Typhus Control]—*Muench Med Woch* 1942 Nr 9 Vol 89 No 2 pp 483-488

GOLD (Herman) & FITZPATRICK (Florence) *Typhus Fever in a Previously Vaccinated Laboratory Worker*—*Jl Amer Med Assoc* 1942 Aug 29 Vol 119 No 17 pp 1415-1416 With 1 chart

This is yet another report of a mild attack of typhus fever in a vaccinated laboratory worker. The patient had been engaged in preparing vaccine from the yolk sacs of chick embryos inoculated with the Breinl strain of *R. cheltisi prowazekii*. Rubber gloves, goggles, a face mask and sterile gown were worn and precautions were taken to prevent the escape of infected spray from the machine used in grinding

the yolk sacs yet the infection was apparently contracted through the respiratory tract [presumably by particles of spray which escaped into the air after the grinding machine had been uncovered]

The attack was mild the fever was deeply remittent and lasted about nine days. The temperature rose above 101 F on four days. Virus was isolated from blood taken on the fifth day of the illness but only one of five guinea-pigs inoculated on the fifth and sixth days reacted. The patient had received 4 cc of Cox's vaccine in four doses the first of which was given three months and the last seven days before the onset of the fever. The agglutination and complement fixation responses at various stages are shown in an abstracted form in the table —

	Agglutination tests		Complement fixation titre
	<i>Proteus O\19</i>	Rickettsiae of European typhus	
Before vaccination	+ - ± 1/1	- 2	0
10 days after 3rd dose of vaccine	+ - 0 ± 1/8	+ 1 ± 1/10	0
5th day of fever	+ 1-	+ 1/8	1
13th day	+ - 0 ± 1/128	+ 1/8 ± - 0	1 - 8
54th day	+ + 1/8 ± 5/8	+ 1/8	32

It will be seen that the immunological response to inoculation was poor. Another technician who had been vaccinated in the same way and had been exposed to the same risk of infection was not attacked in that case the response to vaccination was good the Rickettsial agglutination titre was positive 1-80 ten days after the third dose.

Another case of laboratory infection is reported in an addendum to the note. A suspension of European Rickettsiae was accidentally splashed over the face and right eye four days later an attack of fever followed and lasted four days. Virus could not be isolated from the blood collected on the first and second days but the agglutination titre to *Proteus O\19* and also to *R. pro cazecki* was 1-1280 on the 8th day. This patient had also been vaccinated with an egg yolk vaccine of which 4½ cc in all were given in five doses the last dose was injected three months before the onset. The vaccine had caused no change in the Weil Felix titre but the Rickettsial agglutination titre had risen from nil to positive 1-80 and the complement fixation titre from nil to 1-80 five weeks after the last dose.

The authors point out that if protective vaccination is adopted on a large scale in troops it will be necessary to keep a strict lookout for modified cases which may be indistinguishable in their clinical features from fevers like influenza. In such cases the Rickettsia may be present in the blood in infective form as is shown by its recovery in one of the reported modified attacks.

John W D Megaw

COMBIE⁴CL (D) ZOTTA (G) MANCIULESCU (E) POP (A) & TASCAL (J) Die Schutzimpfung des Meerschweinchens gegen den klassischen Flecktyphus mit Hilfe formalinoteter Rickettsien aus Mäuse- und Hundelunge [The Protective Inoculation of Guinea pigs against Classical Typhus by Formalin killed Rickettsiae from the Lungs of Mice and Dogs — *Ztschr f Hyg u Infektionskr* 1940 Mar 16 Vol 123 No 5 pp 612-676 With 12 figs [20 ref.]

Rickettsia prowazekii has been cultivated in the lungs of young dogs inoculated by the respiratory route and kept at a temperature of 0 C. The yield of Rickettsiae from a given weight of lung was about half that obtained from the same weight of mouse lung but the total weight of the dog lung was 200 to 300 times greater than that of the mouse lung.

The strain of virus used came originally from Bessarabia and had been passed through guinea pigs. The blood and brain suspensions of infected guinea pigs when inoculated intranasally into mice failed to cause Rickettsial pneumonia so that to begin with it was necessary to inoculate mice with suspensions of infected lice which had been inoculated by Weigl's method. Thereafter suspensions of the lungs of the infected mice were used and death followed regularly within 72 hours with massive hepatization. Smears of the lung were very rich in Rickettsiae. Secondary and mixed infections were rather few but in some cases a pseudo-diphtheria bacillus was found in the mears. The authors had often found similar secondary infections in yolk sac cultures.

As the small size of the mouse lung was a serious drawback to the large-scale production of vaccine larger animals were tried and *Citellus citellus* as well as young dogs were found suitable. In the experiments now described young dogs (four weeks old) were used. Each was given an intratracheal inoculation with a suspension made from the lungs of two mice which had been inoculated in a similar way about three days previously. The dogs were kept at a temperature of 0 C and death resulted in less than 72 hours in three of the four animals. Suspensions made from mouse lungs and dog lungs were killed with formaldehyde and injected into guinea pig. Both kinds of vaccine provoked a moderate but variable degree of immunity. Better results were obtained when the total quantity of vaccine was given in three divided doses at five day interval than when it was given in one or two doses.

Details are given of the method of preparing and testing the vaccine. — The lung is ground with sand and suspended in a mixture of ascitic fluid and normal saline (1 to 5) buffered to pH 7.4. To this formalin is added to a proportion of 0.2 per cent. The suspension is centrifuged for five minutes at 1000 revolutions the supernatant fluid is then centrifuged for 45 minutes at 5000 revolutions and the grey sediment is suspended in buffered saline of pH 7.4 to which formalin is added to a strength of 0.2 per cent.

The average mouse lung of 0.3 gm gives 10 cc of vaccine which serves to immunize four persons.

The temperature charts of all the guinea pigs used in the tests are given. From the workers can form their own opinions about the efficacy of the vaccine. The results obtained from mouse-lung vaccines seem to have been better than those from dog lung vaccine.

John B. D. Macrae

GIROUD (Paul) & PANTHIER (René) Comportement du cobaye à l'inoculation de doses massives de rickettsies du typhus historique issues de poumon de souris ou de lapin [The Response of the Guinea-pig to Inoculation with Massive Doses of the Rickettsia of Historic Typhus Obtained from the Lung of the Mouse or Rabbit]—*Ann Inst Pasteur* 1942 Jan Vol 68 No 1 pp 95-98

The usual response of the guinea-pig to historic typhus is well known to be a rise of temperature for 8 to 10 days after an incubation period of 7 to 10 days. Bacilliform Rickettsiae are rarely found in smears of the organs. The authors have already shown that by keeping the infected organs of the guinea-pigs (to be used for infecting others) at -25°C and by lowering the resistance of the inoculated animals by daily injections of bacterial toxins (such as anti typhoid vaccine) a severe disease is caused with subnormal temperature and abundant multiplication of Rickettsiae in the exudates. The virus contained in these exudates becomes adapted to the production of pulmonary lesion in mice after two or three lung passages. When rabbits have their resistance lowered in a similar manner they respond to intratracheal injection of mouse lung virus by a severe pulmonary reaction. After two or three lung passages in the rabbit smears made from the consolidated lungs of the animal contain almost as many Rickettsiae as mouse lung smears. Guinea-pigs inoculated with rich rabbit lung suspensions by the intraperitoneal route respond by a severe illness usually the incubation period is only 24 hours and the temperature remains above 40° or 41°C for seven or eight days. Usually also there is an orchitis reaction on the fourth or fifth day. After this first period of illness the symptoms disappear for two or three days and again there is a short rise of temperature. For several days there is a peritoneal reaction this is shown by the refusal of the testicles to descend when an attempt is made to press them down into the scrotum. This sign may entirely replace the scrotal enlargement. The virus when repeatedly passed through guinea-pigs by the peritoneal route returns to its former low level of virulence for the animals and so it retains its original properties in spite of having become adapted to mouse lung transmission.

John W D Megaw

GIROUD (Paul) & PANTHIER (René) Adaptation au poumon de lapin des rickettsies du typhus historique [Adaptation of the Rickettsia of Historic Typhus to the Lung of the Rabbit]—*Ann Inst Pasteur* 1942 July-Aug Vol 68 No 7-8 pp 381-390 With 1 fig

This paper describes a further development of the work of DURAND and GIROUD in which they produced a vaccine against historic typhus by the intratracheal inoculation of rabbits with suspensions of lungs of mice infected by the nasal route with *Rickettsia proxa eki*. [See this *Bulletin* 1941 Vol 38 p 686] Large quantities of vaccine could be produced in this way but the method was inconvenient because of the need for maintaining a mouse lung strain of the virus for the purpose of ensuring a supply of suspension rich enough in Rickettsiae to cause effective inoculation of the rabbits. This difficulty has now been overcome by lowering the resistance of the inoculated rabbits which are partly shaved kept in a cold environment and injected intraperitoneally at intervals with suspensions of bacteria killed by heat. No fixed rules can be laid down for these injections the size and frequency

of the doses depend on the reactions caused in each animal the temperature curve of weight and general condition must be taken into account. Animals killed from three to five days after inoculation have lungs rich in Rickettsiae and weighing from 30 to 50 grammes. Bacterial contamination are exceptional and each rabbit will at least a litre of potent vaccine. The intratracheal inoculation of rabbit lungs suspension into other rabbits gives rise to pulmonary lesions which are as severe as those caused by mouse lung suspension. When inoculated by the intraperitoneal route these suspensions also cause a severe illness with orchitic reaction in guineapigs. Applied to the scarified skin of a guineapig they cause a reaction very similar to the normal response of the animal to intraperitoneal inoculation with the ordinary type of histone virus.

The immunizing power of the vaccines made from rabbit lungs was put to a critical test guineapig which had received three doses of the formal killed vaccine were found to be as well protected as animal which had recovered from a severe attack caused by intraperitoneal inoculation of large doses of living virus. *John H. D. McFar*

GIRARD (Paul) L'ouveau anti-murine comprennent des substances extraites du poumon de lapin infecté le typhus murin et des rickettsies isolées. Antigenic Power of Substances Extracted from the Lungs of Rabbits Infected with Epidemic Typhus Compared with that of the Isolated Rickettsiae.—*C. R. Acad. Sci. Paris* 1942. Apr. Vol. 176 No. 7-8 pp. 34-343

The lungs were preserved at -20°C and subsequently triturated with formal saline (0.2 per cent). The supernatant fluid after centrifugation which appeared to contain soluble substances set free on the lysis of the Rickettsiae was used and its antigenic power estimated in comparison with that of (1) the same extract with the addition of Rickettsiae (2) Rickettsiae alone and (3) the extract heated to various temperatures. Animals were inoculated with these substances. The sera were subsequently mixed with Rickettsiae and injected intracutaneously into normal animals and the reactions noted (positive if the serum does not contain protective substance) see this *Bullet* 1935 Vol. 35 p. 30.

The extract has good antigenic power perhaps better than those of isolated Rickettsiae but not so good as those of extract plus Rickettsiae. *C. H.*

HAYES (Justin E.) & GILL (Charles I.) Typhus Fever in Massachusetts Report of a Case Contracted in an Out-of-State Endemic Area.—*New England J. Med.* 1942. Jun. 4 Vol. 77 No. 23 pp. 916-917

CARRETERO (Alfonso Vargas) Tifus exantemático murino en Valparaíso (Murine Typhus in Valparaíso)—*Med. Moderna* Valparaíso 1942. Jan. Vol. 15 No. 6 pp. 269-286 With 1 folding plan

During the first seven months of 1941 fifteen cases of a typhus like fever were treated in the German Hospital Valparaíso. This was a relatively large number considering that only 55 cases were reported during the same period in the whole of Valparaíso and Vina del Mar.

The economic condition of 11 of the patients was exceptionally good it was good in the other four. Louse infestation and contact with louse infested or infected persons were excluded in all the cases. In only one instance did more than one patient come from the same house in this case two patients were attacked almost at the same time so that there was no question of transmission of infection from one to the other. The seasonal incidence was quite different from that of louse borne typhus in Valparaiso. The patients came from widely separated localities situated in commercial or industrial areas in which the rat infestation rate was high and ten of the patients were known to have been exposed to exceptional risk of being bitten by rat fleas. Rats caught in a market in Valparaiso in July and August 1941 were found to harbour *Rickettsiae*.

The clinical features of the disease resembled those of mild typhus fever there were no deaths. The Weil Felix reaction was positive in 13 cases in titres of 1-100 to 1-6400 it was negative in one patient who was tested only on the 7th day and the titre was only 1-50 in another tested only on the same day of the illness. No animal inoculations were carried out but the clinical and epidemiological features pointed strongly to a flea borne infection.

John W. D. Megaw

BARLOVATZ (A) & JOUKOVSKI (Th) *Quinze cas de fièvre pseudo boutonneuse observés au Congo belge* [Fifteen Cases of Pseudo Boutonneuse Fever seen in the Belgian Congo]—*Ann Soc Belge de Med Trop* 1940 June 30 Vol 20 No 2 pp 157-171
With 1 chart

Early in the course of this article the authors express a desire to avoid the addition of a new barbarous name to a list that is already too long but they have used three new and distinct names for the disease these are erratic fever pseudo boutonneuse fever and boutonneuse tick bite fever.

The disease differs in its epidemiology from both boutonneuse and tick bite fever in the complete absence of contact on the part of the patients with dogs or tick infested cattle. Ticks are said to be rare in the forests of the district. Ten of the 15 patients had a local sore this was on the scrotum in nine cases and on the thigh in one. The situation of this inoculation sore pointed to a tick or mite as the vector yet none of the patients recalled a bite by an insect. All the patients were seen in Maxima a hot and damp forest region in the Belgian Congo they came from two places 120 kilometres apart with a total European population of 300. Twelve of the patients were Europeans and eight of these had not been in the forest for several weeks before the onset none of them kept dogs pigs or cattle. The cases were strictly sporadic no person to person infection occurred and the seasonal distribution was impartial over the whole period of 18 months.

The fever curve had a step like rise an irregular deeply remittent course and an average duration of 11 days the extremes being 8 to 13 days. The local sore was accompanied by lymphadenitis with associated single or multiple buboes which sometimes preceded and sometimes followed the onset of the fever. There was generalized adenitis in all the cases. The attacks were mild no patient was dangerously ill at any time. The rash was maculo papular it always appeared on the fourth day extended over the trunk and limbs.

and usually reached the face. In one of the indigenous patients no rash could be detected. The palms and soles are not mentioned as having been involved except that in one case were the palms but not the sole were involved. No cases were seen in the local indigenous population. It was presumed that they had become immunized by previous attack.

The Weil Felix test was made in 14 cases. In four it was negative throughout the illness and convalescence. In one patient it was negative in test made up to the 20th day but on the 27th day the titre to *Pr O* 1/1000 and to *Pr O* 1/100 in another patient the reverse positive reaction to *Pr O* 1/1000 two days after the end of the fever. The reaction to *Pr O* 1/1000 was negative throughout in all the cases.

Clinically the illness closely resembled the typhus of Kenya the pseudo typhus of Batavia and boutonneuse fever. Three guinea pigs and one monkey were inoculated intraperitoneally with 5 cc each of blood from a febrile patient but no reactions followed. In this respect the disease resembled boutonneuse fever.

The authors do not express any opinion about the vector. The clinical and serological features point to a mild tick borne typhus but the epidemiological condition do not support this view. The Weil Felix reaction is strongly opposed to a mite borne or flea borne infection.]

John H. D. Megaw

SYLLA (Adolf) Ueber die Wolhynische Krankheit. [Wolhynian Disease (Trench Fever)]. — *Med. Klin.* 1940, July 31, Vol. 38, No. 31, pp. 726-729. With 3 charts.

The author prefers the name Wolhynian disease to Wolhynian fever because many of his cases did not run a febrile course. He regards the transmission of the infection by lice as firmly established but has not the same degree of certainty about the causal organism. Mixed infection may play an important part and spirochaetes deserve consideration in fact he prefers to regard the condition as a group of diseases rather than as one.

Although he has seen about 200 cases of typical Wolhynian fever in one sector of the front during the present epidemic he states that cases of the disease described in the last years are really exceptional. [He appears to be referring to the relapsing type with five-day periodicity and perhaps he has not read the British descriptions of the disease.] Most of the cases were ambulatory and the patients remained on duty. The chief pains in the back of the neck, loins and limbs were unilateral usually also there were pains in the bones of the leg and joint pain was not infrequent. The fever was slight or altogether absent. The whole attack lasted one to even days.

In the cases admitted to hospital the onset was usually sudden in some cases the temperature kept up for three or four days and then fell slowly to normal. In others the fever was fairly high for one day then fell gradually and was followed by further attacks. Fever with five-day periodicity was exceptional when it occurred the final spell of fever occasionally lasted five to eight days and ended by crisis. Fever of the undulating type was sometimes seen and often there was no continued fever for a week to a fortnight. Apart from the five day type there was hardly any characteristic fever curve.

The symptoms on the whole resembled those described by writers in the last war the shin bone pains being prominent features in many cases. The spleen and liver were palpable in about half of the cases and often were tender on pressure. The glands of the neck axillae and groins were enlarged in five to ten per cent of the cases this feature was often accompanied by lymphocytosis sometimes as high as 60 per cent. Occasionally there was a rash this was macular papular or scarlatiniform and was usually fleeting. No change occurred in the blood picture in mild cases in severe attacks the leucocyte count was raised the highest count was 12 000.

The total duration of the illness was from one to six weeks. Diagnosis may be quite impossible at first the onset may closely resemble that of typhus or influenza. Weil Felix titres of $\pm 1-100$ and Widal titres of $+1-200$ were not uncommon. No drug was found to have a curative action the results from sulphapyridine were not encouraging but neosalvaran and atabrin were helpful in the early stages.

[No reference is made to the epidemiological conditions connected with the epidemic. The virulence of the infection appears to have been very low perhaps the shortness of the period of invalidism may have been due to absence of the co-dying which some observers think was overdone by us in the last war.]

On the other hand it may be that trench fever has not yet got into its stride in the present war it may again become a serious military problem in louse infested troops.]

John W D MacGill

YELLOW FEVER

HARRIS (W Victor) Notes on Culicine Mosquitos in Tanganyika Territory — *Bull Entom Res* 1942 Sept Vol 33 Pt 3 pp 181-193 With 1 fig [10 refs]

The author has undertaken work on the Culicines of Tanganyika as a part of the precautions undertaken against the possible spread of yellow fever.

The first part of the paper presents a full list of all the species known to occur in the Territory with localities and brief notes on breeding places. Nearly 80 species of Culicines have been recorded by the author or previous workers. Harris then passes on to a more detailed treatment of the domestic *Aedes*. He finds that in domestic water containers in Dar es Salaam *Aedes aegypti* is much the commonest species several species of *Culex* are also fairly common but *Aedes* species other than *aegypti* are rare. In tree holes in the same town *Aedes aegypti* predominates but *Aedes simpsoni* and *metallicus* are common. A very large number of trap breeding places short sections of wide bamboo filled with water were hung up in many townships. In these *Aedes aegypti* and *simpsoni* breed abundantly.

P A Buxton

175 BERGHE (Louis) Sur une variation brusque spontanée du tropisme de la souche française neurotrophe du virus de la fièvre jaune [A Sudden Spontaneous Variation in the Tropism of the Neurotropic French 1940 Strain of Yellow Fever Virus]—Ann Soc Belg de Méd Trop 1940 June 30 Vol 20 No 2 pp 187-207 With 1 plate 14 ref 1

The decrytion of a sudden variation in the neurotropic French strain of yellow fever virus which at its 32nd passage in mice was inoculated intracerebrally into a baboon (*Papio papio*) and produced a fatal encephalitis with all the symptom characteristically with a liver topic train. The monkey died on the fifth day with typical symptoms of the cerebral train and similar results were obtained in a second series of subinoculations from the first. Moreover when the virus from the latter was inoculated intracerebrally into mice the duration of the resulting encephalitis was 6 to 7 days and only became shorter after successive passages in mice. In all the monkey's behaviour of the neurotropic train and also of the fatal encephalitis. The virus produced death from encephalitis within 24 hours in the case of a typical neurotropic train.

The sudden variation of the neurotropic and neurotropic properties of the virus in the baboon seems to be of the nature of a chance variation. The author remarks that this might happen in the case of human subjects inoculated by the same method which involves the subcutaneous inoculation of neurotropic virus. It is of interest that the baboon is not susceptible to subcutaneous inoculation of the neurotropic train.

The virus described can only be explained by the co-existence in the virus of partial repeated brain passages. The virus in fact pan-tropic but after repeated brain passages the predominance of neurotropic partial. The influence of the tissue environment seems to decide the preponderance of either neurotropic or neurotropic (brain). It is therefore not a mutation in the strict sense of the word but a variation depending on external conditions in the culture tissue of the host.

E. Hindle

JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION 1940 Sept 5 Vol 56 No 1 pp 51-53—The Outbreak of Jaundice in the Army Summary appears also in J. Clin. Med. 1940

Circular letter No 9 from the Surgeon General's Office has described the following facts relating to the occurrence of jaundice in the American Army. In the 14th of August 1941 page 1110 the Secretary of State for War of the U.S.A. as quoted as giving the following case: 588 cases of death from the disease. The vaccine used was actually the same as has been made and used for several million inoculations in Brazil and in England since November 1937 with no resultant case of jaundice. These cases commenced about March 1941 with the peak of the incidence in the week ending June 20th and a progressive decline since then. Like previous occurrence of the condition in England in 1936 and 1937 and Brazil in 1937 the clinical condition closely resembled

so called catarrhal jaundice or infective hepatitis of unknown aetiology. The incubation period of this disease varies between 40 and 120 days and extend even to six months in a few cases [By contrast in ordinary catarrhal jaundice the incubation period is between 20 and 30 days]. Points of interest were that the temperature was usually normal or only slightly elevated the leucocyte count usually normal with occasional relative monocytosis and the most striking fact that about 20 per cent had pains in the joints and urticaria. The liver was enlarged and tender in about a fifth of the patients. Most of the cases were very mild many being discovered only at special examinations. The case fatality rate of 0.2 per cent (based on hospital admissions) is considered to be high as undoubtedly many patients with mild affections never went to hospital. In general recovery occurred in four to eight weeks. Sufficient evidence has been obtained for the Surgeon General to feel that he can state that recovery is complete in the vast majority of cases and that permanent liver damage may occur in only a few.

In the fatal cases death usually occurred within two to six weeks after the onset of the disease indicating that here the destructive process and removal of debris by lysis is rapid. The areas of liver damage appear to be focal with completed destruction in some whereas in others only the central parts of the lobules are affected. Fatty changes are rare and repair is usually brought about by multiplication and hypertrophy of remaining liver cells. [The lesion does not appear to be specific being very similar to that found in fatal cases of infective hepatitis and arsenamine jaundice]. There is also marked oedema often accompanied by intense inflammation of the gastro intestinal tract. The spleen is usually enlarged. Haemorrhages in the serous and mucous membranes are common. It is notable that in patients who have died from accident or disease subsequent to an attack of jaundice little or no evidence of preceding damage has been found.

One of the most interesting features of this disease has been the absence of secondary cases in spite of the fact that large numbers of post yellow fever vaccination cases have been in the midst of many times their number of non vaccinated individuals or individuals vaccinated with non icterogenic lots. [Those who consider that this disease may result from a sensitization with the human serum used in the vaccine consider this an argument in their favour].

It is quite evident that this outbreak like the others that have occurred following the use of a similar vaccine is not a form of infection with yellow fever virus. As a result of these cases the human serum component has been left out of the vaccine and it is believed that the risk of jaundice has been eliminated.

F O MacCallum

FOX (John P) MANSO (Caio) PENNA (H A) & PARÁ (Madureira)
Observations on the Occurrence of Icterus in Brazil following
Vaccination against Yellow Fever—*Amer J Hyg*, 1942 July
Vol 36 No 1 pp 68-116 With 9 figs 1 map & 2 charts
[44 refs]

In 1936-37 both FINDLAY and MACCALLUM in England and SOPER and SMITH in Brazil observed jaundice after a considerable interval in individuals who had received yellow fever vaccine. Shortly after this an attenuated strain of yellow fever virus was developed (the 17D strain) which could be used without the accompanying large amounts

of human serum chiefly of human origin previously necessary. [This strain was adopted for use in U.S.A., South America and Finland and the method of vaccine preparation has been essentially the same in all these countries.] Growth of the virus has been maintained in suspended cell cultures of chick embryo tissue and serum tyrode (1:10). The supernatant fluid of these cultures was used to infect developing chick embryos which after further incubation were removed and suspended as a 10 per cent suspension in what was considered to be normal human serum. Over a million people had been inoculated with this new vaccine in the various countries without any serious effect when Fox and his colleagues met the same jaundice in Brazil as referred to above. The first outbreak occurred four to five months after the use of a single batch in May 1939. There were 1,260 cases diagnosed with one death. In 1940 two other batches were definitely incriminated. A clinically somewhat similar jaundice was present in non-vaccinated persons in many of the areas studied but the estimated incidence of the spontaneously occurring disease in the unvaccinated was 0.14 per cent only, a much lower rate than in the vaccinated group. Certain other lots were followed by a small percentage of cases which however were two or more times the rate approximated for the non-vaccinated group. There were about 107,000 people inoculated with the incriminated lot which produced 1,072 diagnosed cases with 24 fatalities.

As in previous occurrences the incubation period was long being in the great majority of cases 12 to 20 weeks. Clinically the cases greatly resembled those of catarrhal jaundice. As before the duration and severity of the disease varied greatly, some patients failed to develop icterus but had typical prodromal symptoms with dark urine, others were ill for more than six months, others died. Death most often occurred from 25 to 40 days after the onset of the illness. In approximately 30 per cent of cases the liver was found to be enlarged in the first two or three weeks of the disease. Palpable enlargement of the spleen was infrequently noted. Of interest is the absence of any mention of the occurrence of urticaria which was found in a number of the patients in the recent U.S.A. outbreak. A slight leucopenia was found in some cases. A positive correlation existed between the severity of the disease and the apparent impairment of liver function as indicated by the icterus index or bromsulphthalein tests. However the average level of the serum bilirubin was low. In the majority of cases clinical recovery was accompanied by a restoration to normal of the previously and often seriously impaired liver function.

Pathological examination of the fatal cases revealed little of significance except for the liver. The size of the liver was usually reduced. Sometimes it had a nutmeg appearance and was usually granular or even nodular. The microscopic picture varied in the extreme in different parts of the same liver.

The primary change usually was a degeneration of hepatic cord cells which tended to be more pronounced in the central zones. In cells not yet frankly necrotic the cytoplasm showed hydropic swelling, fine droplet fatty change and at times the accumulation of bile pigment. The nuclear changes consisted of total swelling, nucleolar oedema, marginal condensation of the chromatin and nuclear pyknosis. Inclusion bodies were never found. Some showed biliary hyperplasia with moderate round cell infiltration and marked fibroplasia in the

periportal area. In some areas all the parenchymal cells had undergone necrosis and the cellular debris had been removed with little or no fibrous tissue proliferation.

Like previous workers on this problem the authors over a period of eight months have failed to reproduce the disease in monkeys, rabbits, mice, guinea-pigs or chicks by inoculation of incriminated vaccine or human material.

They made several very interesting observations in the course of following up their cases. One of the most striking was the extreme variation in incidence from 0 to 19 per cent of cases in large groups in different areas inoculated with the same lot of vaccine. They also found that the incidence was very low in children and adolescents in contrast to the spontaneous disease which mainly affects this group. They feel that some second factor must play a part in producing this divergence of results in different groups. This factor as previously suggested might be of infectious nature or a chronic intoxication. The authors also suggest that it might be merely a state of lowered hepatic resistance due to alimentary deficiencies. Pre-existing immunity to the agent in the vaccine seems improbable to the authors in view of the manifestly greater susceptibility of the adult population and failure of urban populations to be more resistant than the rural inhabitants.

Previous investigators have suggested the possibility that the agent producing this jaundice has been present in the so-called normal human serum used in making the vaccine. As in previous investigations none of the donors whose serum was used gave any history of jaundice and the serum was heated at 56 C for 30 minutes before use.

Fox and his colleagues have now eliminated human serum from their vaccine. Sufficient embryos are available for them to use merely the supernatant of centrifuged finely ground infected embryos as their vaccine and the same material is used as seed virus for inoculating subsequent embryos. No jaundice has occurred in 164 000 individuals inoculated with vaccine prepared by this method.

[This is surely one of the most intriguing problems of the present day. It is obvious that the condition is not a form of yellow fever for the jaundice has been produced in individuals who have been shown to be immune at the time of inoculation and in others when the vaccine injected was found to contain no active yellow fever virus when inoculated into test animals.]

The condition has been produced in people living in U.S.A., England, South America and Africa under all sorts of conditions but the clinical picture is essentially the same. Fox and his group have suggested that chronic intoxication and dietary deficiency may play a part in South America but this obviously does not apply to the U.S.A. Army in which the recent outbreak has occurred in large groups under uniform conditions while other members of the same vaccinated group remain well. Most of the available evidence suggests that the human serum is the culprit. If this is so carriers of the agent must be rare when one considers the amount of serum previously used for this vaccine in various places without such an occurrence. It has been considered to be an infectious agent which one hopefully thought would be destroyed by heating at 56 C for 30 minutes. Perhaps in these two outbreaks more resistant strains have been encountered. Till the condition has actually been reproduced with the same donor's serum separate from the vaccine this is still theoretical. Of course there does

remain the possibility that it is the result of a homologous serum reaction due to some rare peculiar property of certain human sera. Transmission experiments as yet unsuccessful seem to hold the key to the problem.

F O MacCallum

FOX (John P.) LEVANTIE (Edwin H.) MANSON (Cairo) & ACHIAS (Jacq. R. Scuzi) Encephalitis in Man following Vaccination with 17D Yellow Fever Virus—*Amer. J. Hyg.* 1942 Sept. Vol. 36 No. 2 pp. 117-142 28 ref.

For the first time the isolation of the virus of yellow fever many different types of infected human and animal material living and inactivated have been used in an effort to produce immunity. Of course the ultimate aim has been to find a vaccine which would produce the maximum immunity with the minimum reaction. Some workers chiefly French used the so-called French neurotropic strain in the form of infected mouse brain. This produced a rather high proportion of benign reaction and also a considerable number approximately 12 per cent in one group of relatively severe and even occasionally fatal reaction involving the central nervous system. For a number of years American and British workers used this strain also but always accompanied by adjuvant quantities of immun serum. This latter method was replaced in 1937 by the use of an attenuated strain known as 17D which developed after repeated passage in tissue culture of chick embryos etc. The ability to produce fatal encephalitis in monkeys on direct intracerebral inoculation apparently had been lost but encephalitis could still be produced in mice although after a somewhat increased incubation period. Careful observation of many thousands of inoculated individuals chiefly in Brazil revealed that about six to eight days after inoculation 5-10 per cent developed light headache, malaise and general body aches but less than 0.5 per cent were away from work for even one day.

Suddenly in July 1941 cases of definite encephalitis appeared among persons recently vaccinated against yellow fever by Fox and his colleagues. This was followed by the use of batches of vaccine made from exarub strain of the original 17D virus in different localities. As well as the usual mild reactions on the sixth to eighth day a certain number of inoculated persons developed more severe reactions with onset of encephalitis from the 10th to 21st day after inoculation. The percentages of the reaction and their degree of severity varied with the different batches of vaccine. In the latter a most extensive study 0.5 per cent of 5,073 persons vaccinated experienced these abnormally severe reactions and one case was fatal. The severe reactions were more frequent among the younger age group.

Thorough investigation indicated that the vaccine itself was responsible and not any extrinsic agent.

The sudden alteration in character of the virus seemed to have occurred during a very small number of subcultures away from the parent strain. No suggestion is made of any factor which might have caused it. Fox and his associates have since altered their technique so that all the vaccine used is initiated from primary and secondary seed batches of known character and adequate size as recently described by them [above].

F O MacCallum

SANDFLY FEVER

PIRILILA (P. P.) & PODOLJAN (V. J.) The Prophylaxis of Phlebotomus Fever by Means of Sandfly Control in City Conditions — *Travaux Acad. Milit. Méd. Armée Rouge U.R.S.S.* Moscow 1941 Vol 25 [In Russian pp 255-270 With 10 figs English summary p 271]

The prophylaxis of sandfly fever by control of the vectors is quite possible

The control should be developed in three directions

(1) A control of the larvae

(2) A mechanical protection of habitations from the entry of the sandflies

(3) Destruction of adult sandflies

In the control of the larvae it is not sufficient to clean the territory and sprinkle it with chloride of lime. The latter destroys only the larvae lying superficially immediately touching them whereas the larvae are to be found not only on the surface of the ground but often penetrate into the soil to different distances from the surface. Therefore a substance should be used penetrating actually into the soil for instance benzene polychlorines widely applied in agricultural practice against harmful insects. After a single application of polychlorines—(reckoning 75 cc. to every square metre) the sandfly larvae are most perniciously affected for several weeks which has been proved by tests especially carried out

For adult sandflies the best way is to use flytox. For this purpose in any territory where the anti sandfly measures are being realized one should have special staffs for the daily destroying of sandflies flying into the habitations. Special apparatus is used for this purpose—a flush of the fluid is directed against the sandflies sitting on the wall in the corners and other places of habitation.

A preliminary sprinkling of the walls with flytox has no practical importance because it evaporates very quickly and the remaining odour is too insignificant to repel the sandflies.

Moreover fly toxic fumigations with pyrethrum powder may be also applied reckoning from 1.5 to 2.0 grams to every square metre.

The control of sandflies regularly organized and carefully carried out in 1939 resulted in a decrease of morbidity with sandfly fever in the given territory. This was expressed in a decrease of the number of sick persons in the territory under test to 40-45 per cent as compared with 1938 when no measures were taken against sandflies. Whereas in the neighbouring territories where the control of sandflies could not be undertaken in 1939 the morbidity with papataci fever as compared with that of 1938 increased.

PLAGUE

MOLL (Aristide A) & O'LEARY (Shirky) Plague in the Americas
X Venezuela — *Bol Oficina Sanitaria Panamericana* 1942
Aug Vol 21 No 8 pp 780-783 With 1 map [Ref in
footnotes]

Most of the South American Republics have some notes or the
peculiarity in their relation to plague introduction. Venezuela was
next to Bolivia the last South American country to be invaded by
plague (1908). Some delay as was almost to be expected occurred
over the primary recognition of the disease as such but the infection
appear to have been quickly eradicated from the ports of the country.
It persisted in the interior. The statistical data of plague are not very
convincing and a footnote to this article states with regard to one
decade of disappearance of plague — At the time it was completely
rumoured in Caracas that since the regime then in power was completing
its first 10 year term in August 1919 it chief had ordered that plague
should disappear from the country. It is a fact however that the
campaign against the disease had been pushed with vigor and kill
Hopes have once and again been raised in Venezuela that plague had
truly disappeared only to be dashed by its reappearance in epidemic
form. The last of these epidemics seem to have occurred toward the
end of 1939 and the beginning of 1940 in the State of Aragua. The
features of Venezuelan plague differ little from those of the other
South American republics. H F Harvey

MACCHIARELLO (Attilio) *Bacteriologia general d la peste bubonica*
observada en el nordeste Brasileiro [Bacteriology of Plague in
North East Brazil] — *Argu ros de Higiene* Rio de Janeiro 1941
Dec Vol 11 No 2 pp 53-63 [18 refs] English summary

In this study the strains were 31 in number derived from human
cases rats and fleas — 1 human septicaemic 18 bubonic rats 10
and fleas. Strains obtained from inactive cold inguinal bubo
(*ingua de frio*) and multiglandular plague are not included because these
are dealt with separately. All the usual tests were applied and it was
found that the Brazilian strain all recently isolated showed no
significant differences between human murine and flea strain nor did
they differ essentially from European and American strains. H F Harvey

MACCHIARELLO (Attilio) *Bacteriologia de la ingua de frio* [Bacterio-
logy of the Cold Inguinal Bubo (*ingua de frio*)] — *Argu ros de*
Higiene Rio de Janeiro 1941 Dec Vol 11 No 2 pp 67-70
English summary

Failure to isolate the plague bacillus from cases of *ingua de frio*
had led to the supposition that these buboes might be referable to
some other disease. The author has however isolated 8 strains of
plague from this affliction and has studied their bacteriological
characters. This study has shown that except for some greater
lability difficulty of isolation and morphological frailty the strain
exhibited no characteristics sufficient to make them a special race or
variant of *P. pestis*. The disease appears to be an attenuated form of
bubonic plague. H F Harvey

MACCHIAVELLO (Atilio) Bacteriologia da la fiebre multiganglionar pestosa [Bacteriology of Multiglandular Plague]—*Arquivos de Higiene* Rio de Janeiro 1941 Dec Vol 11 No 2 pp 71-72 English summary

The plague strains isolated in this affection do not differ fundamentally from other strains of North East Brazil. As for the organisms *Klebsiella* and *Brucella bronchiseptica* isolated from cases of multiglandular plague they are identical with the same bacteria isolated from rats. There is no reason to refuse recognition of the multiglandular fever syndrome as a distinct clinical entity. A concomitant bacteraemia of non plague type and not fatal would seem to be a possibility to be considered. H. F. Harley

MACCHIAVELLO (Atilio) Estudio sobre variación bacteriana de la *Past pestis* con especial referencia a variaciones en morfología caracteres de las colonias virulencia toxicidad y propiedades bioquímicas [Study of Variability of the Plague Bacillus]—*Arquivos de Higiene* Rio de Janeiro 1941 Dec Vol 11 No 2 pp 73-102 [16 refs.] English summary

Although these studies touch on the variability of plague bacilli in relation to biochemical characters virulence serology sensitiveness to phagocytosis and formation of pigment the main investigation and discussion has reference to the morphological variation of the organism and its colonies. Roughness and smoothness are specially considered and explanation is forthcoming to account for the diversity of opinion of many authors. The four strains included in the present study came from human cases of septicæmic and bubonic plague *in* *media de frio* multiglandular plague from rats dying spontaneously of plague from syriatic rodents and from fleas. A few laboratory strains completed the total. Most of the strains were freshly isolated and the media used in the morphological study of colonies were simple agar and sulphite agar.

The author concludes that environmental factors are decisive in obtaining unstable variants of smooth rough or intermediate appearance virulent or avirulent. The morphological variations in colonies were not accompanied by changes in biochemical properties nor was there always correlation between the rough or smooth appearance of the colony and virulence. It follows that the effectiveness of dissociation is not to be judged from the superficial smooth or wrinkled aspect of a culture. It does not seem possible to maintain with SCHUTZE that *Past pestis* is a bacterium which is constantly in the rugose phase. The author decides that it is not surface appearance which is most important as an index of virulence of a strain but the granular or homogeneous internal structure of the colony. This configuration is likewise related to other characters such as stability in saline suspension agglutinability and sensitiveness to phagocytosis. The homogeneous and intermediate colonies—finely granular and also virulent—are unstable the coarsely granular and avirulent are stable. This new way of looking at variation of the plague bacillus in regard to its structure and other variables instead of the greater or less rugosity of the surface of its colony explains in all probability the contradictory statements which have appeared in the literature. The smooth antigen therefore of the plague bacillus is an antigen of the deep structure and

is without influence on the morphology of colonies. An exception has to be made for dwarf colonies which are a truly smooth form of this organism. B. I. Harvey

MACCHIAVELLO (Atilio) Variante atípica d *Pasteurella pestis* aislada en el nordeste del Brasil [Atypical Variants of the Plague Bacillus from N.E. Brazil — *Archivos de Hygiene* Rio de Janeiro 1941 Dec Vol 11 No — pp 103-108. English summary.]

In the course of this extensive study of the characters of the plague bacilli of north-east Brazil two strains have been isolated which are considered by the author to be true and stable mutation from the normal type. One of these two 211 X was isolated originally by puncture from a bubo in a human case of plague the other 23' X from the spleen of a rat dead of plague. These two strains were found to possess the same characters and to differ significantly from the organism of normal type. The investigation of characters comprised morphology of colonies experimental inoculation the morphology of the organism in tissues and colonies biochemical properties agglutination and other serological tests. Differences were found in the appearance of some of their colonies in the morphology of the bacteria in their diminished biochemical activity in the production of uniform turbidity in certain liquid media in increased production of alkali in broth and milk in their exaggerated tendency to agglutinate spontaneously in saline solution even of low concentration in the failure to form envelope antigen at 37°C in their serological relation with other strains etc. B. F. Hing

MACCHIAVELLO (Atilio) & PARACAMPOS (Helio) Sobrevida y virulencia de la *Pestis* en las condiciones ambientales de los trópicos. I. En vísceras de animales encontrados muertos durante epizootias pestosas y en víscera de cadáveres humano. [Viability and Virulence of *P. pestis* in the Tropics. I. In the Viscera of Dead Animals and Man — *Archivos de Hygiene* Rio de Janeiro 1941 Dec Vol 11 No 2 pp 109-117. 17 ref.] English summary.

It is very necessary to be aware of the effect of environmental factors on the plague bacillus especially in tropical lands and where material may have to be sent from a distance to the laboratory for diagnosis. Factors which are unfavourable to the life of the organism which come into play with the death of the animal or patient and which are operative during the transit of material may lead to what the author describes as false negatives in deciding the existence of plague epizootics or epidemics. The material examined consisted of liver or spleen and was embedded in paraffin for despatch according to the method of Loner or suspended in glycerine (pure or diluted). In a certain number of cases the procedure was to make cultures on agar or sulphite agar and send these to the laboratory. The material thus obtained was inoculated into guinea pigs. Sufficient simultaneous controls were instituted to afford comparison with normal favourable conditions. The author concludes that to a very large extent the environmental conditions—heat desiccation putrefaction and variations of humidity—are much more active in producing negative results in tropical than in temperate or cold climates. They do not therefore truly signify absence of plague.

infection at the source. The best practical method of despatch in the tropics is cultivation from a large piece of test tissue sent in a tube. The simple and secure method of LONG is adapted to tropical conditions for a non technical personnel

W F Harvey

MACCHIAVELLO (Atilio) & PARACAMPOS (Helio) Sobrevida y virulencia de la *Pasteurella pestis*. 2 En organos de animales pestosos conservados en el frigorifico a 4-10 C o a 0-5 C—segun los casos— [Viability and Virulence of *P. pestis*. 2 In Animal Organs kept in the Ice Chest]—*Archivos de Higiene* Rio de Janeiro 1941 Dec Vol 11 No 2 pp 119-126 English summary

The first experiments had reference to the comparative vitality of *Past. pestis* in spleen and liver of guinea-pigs, and rats when kept in the ice chest for variable times up to four years. It was found that the bacilli were maintained alive better in the spleen than in the liver. Some laboratories do not recommend sending plague liver because the rapid autolysis which takes place destroys the plague organisms. In the case of Chilean strains it was possible to restore the virulence of bacilli which had become progressively attenuated in the spleen if the time of preservation had not exceeded six months. Brazilian strains on the contrary lost their virulence much more rapidly, and this loss was often not reversible. It was shown that the loss of virulence did not depend—at least to any extent—on the action of cold (0-5 C) but upon factors relating to the organisms themselves or to the tissues of the animals inoculated. On the whole refrigeration of organs of animals is not recommended as a routine method of preserving the plague bacillus

W F Harvey

MACCHIAVELLO (Atilio) & PARACAMPOS (Helio) Sobrevida y virulencia de la *Pasteurella pestis* (Cepas brasilenas). 3 En organo de cobayo pestosos mantenidos en glicerina y conservados en el frigorifico a 0-5 C [Viability and Virulence of *P. pestis*. 3 In Organs of Guinea-pigs kept in Glycerine at 0-5 C]—*Archivos de Higiene* Rio de Janeiro 1941 Dec Vol 11 No 2 pp 127-131 English summary

In the tissues of plague guinea-pigs kept in 50 per cent pure glycerine at 0-5 C the bacilli lose their viability and virulence progressively. Brazilian strains showed these changes earlier than other strains. The attenuating action was not due to the glycerine nor yet to the cold alone but could be observed in material not submitted to these conditions. This method of preservation is not to be recommended for preserving the viscera of plague animals

W F Harvey

MACCHIAVELLO (Atilio) Sobrevida y virulencia de la *Past. pestis* (Cepas brasilenas). 4 Mantenedas en cultivos no repicados a las condiciones ambientales de los trópicos. [Viability and Virulence of *P. pestis*. 4 Kept in Cultures without Subculture under Conditions prevailing in the Tropics]—*Archivos de Higiene* Rio de Janeiro 1941 Dec Vol 11 No 2 pp 133-141 [11 refs] English summary

It is important to know in tropical countries the extent to which the surrounding conditions affect the viability and virulence of cultures in

the course of transport to the laboratory. This was studied for *P. pestis* by cultivating the organism in solid and liquid media and keeping the cultures for various periods at the temperature of the laboratory. Even after 284 days by which time the solid media appeared to be completely dried up it was possible to obtain living subcultures. The virulence undoubtedly diminished but less than in those cultures which under the same temperature conditions were repeatedly subcultured. The addition of blood to the medium notably protected the viability and the virulence. In liquid cultures the results were influenced by the composition of the medium. In this case sterilization with negative subculture appeared to depend on the concentration of toxic substances catabolic or mineral. When viable subcultures were obtained from liquid media the virulence did not appear to be appreciably diminished and this suggests that such loss in the case of solid media must be due to desiccation.

In practice it seems preferable to send material for diagnosis in the form of cultures instead of in the form of tissues or viscera.

W. F. Harvey

MACCHIARELLO (Atilio) & PARACASIOS (Helio) Sobre vida e virulência de las *Yersinia pestis* (Cepas brasileira) 5 En cultivos no repicados durante 5 a 8 anos conservados por el método de A. J. de Almeida. Viability and Virulence of *Y. pestis* 5 In Original Cultures not subcultured for 5 to 8 Years. Method of Assay.—*Arquivos de Hygiene* Rio de Janeiro 1941 Dec Vol 11 No 2 pp 143-149. English summary.

Preservation of *P. pestis* in culture whether kept in the ice chest or at low temperature whether in sealed tube, in phosphoric vacuum or frozen has demonstrated the great vitality of this organism. Desiccation shortens the period of survival. The method of A. J. designed to prevent drying consists in keeping the organism in stab culture under a layer of 1 to 2 cc paraffin oil and preserves the life of the bacillus kept either at room temperature or under optimum conditions. Virulence however is notably diminished and this contrasts with its preservation in the ice chest. In one of the experiments the organism although attenuated had its virulence raised to normal by passage through guineapigs.

W. F. Harvey

JUNIOR (Marcelo Silva) Peste e seu diagnóstico no homem e nos roedores. Peste no homem. Tratamento [Diagnosis of Plague in Man and Rodents. Treatment.—*Arquivos de Hygiene* Rio de Janeiro 1941 Dec Vol 11 No 2 pp 151-155. With 8 figs & 1 chart. English summary.

This article is a detailed description of plague in its clinical pathological and therapeutic aspects with abundant reference to the views of well known authorities. In particular a very useful differential diagnosis from tularaemia is given in paragraphs arranged in two parallel columns. The author commends the use of an intradermal reaction in the diagnosis of plague and describes the preparation of the antigen for this purpose.—A primary bubo from a guineapig inoculated subcutaneously with plague of the locality is boiled for two hours in normal salt solution. It is then ground up in normal saline in the

proportion of 1 gm to 20 cc and filtered through sterile gauze. Phenol (0.5 per cent) is added and sterility is tested. The injection dose is 0.1 cc.

W. F. Harvey

LOWE (J) A Note on the Work of Dr P. L. Simond on the Transmission and Epidemiology of Plague—*Indian Med Gaz* 1942 July Vol 77 No 7 pp 418-421

BACILLARY DYSENTERY

BRICENO IRAGOIRRI (L) *Dysentery bacilar* [Bacillary Dysentery (in Venezuela)]—*Cac Med de Caracas* 1941 Dec 15 & 31 Vol 48 Nos 23 & 24 pp 365-372 & 1942 Jan 15 & 31 Vol 49 Nos 1 & 2 pp 2-9 [40 refs]

[This article deals not only with bacillary dysentery but in the first part at least with dysentery in general and the opening pages have more a historical than a purely scientific importance.] The author shows how vital a matter dysentery is in Venezuela. He divides the earlier times into three periods: (1) Before anything was known as to the real cause of dysentery. (2) From the discovery of the amoeba as a cause. (3) When causative bacteria began to be studied.

He next describes the various dysentery organisms, their biochemical reactions and their classification. He gives figures for 1938-40 to show the distribution of deaths from dysentery, amoebic or bacterial and of unknown origin. Details are given for 20 districts, the totals being: In 1938 202 amoebic, 32 bacillary, 163 unknown (together 397); in 1939 204, 19 and 141 (364); and in 1940 218, 24 and 143 (385) respectively, or 624 amoebic, 75 bacillary and 447 of undetermined cause [a proportion so large must detract from the value of the other figures as determining causation].

Next he describes the result of a study of strains isolated in outbreaks in different parts of the country. In San Cristóbal and Tariba in the State of Tachira, La Victoria in the State of Aragua and Tinaquillo in the State of Cojedes and Caracas. Altogether 127 strains were differentiated: of these 97 were *Bact shigae*, 27 *Bact flexneri*, 2 *Bact sonnei* and 1 *Shigella ambigua* (Schmitz's organism). Neither *Bact shigae* nor *Bact sonnei* was found in Caracas patients. The Schmitz organism was found in Tinaquillo. H. Harold Scott

WALTHER (G.) & GÜNTHER (L) Das Verhalten des Serumchlors bei Flexnerruhr [The Chloride Content of the Serum in Flexner Dysentery]—*Klin Woch* 1942 Aug 15 Vol 21 No 33 pp 726-729 [10 refs]

The chloride content of the serum is affected in various ways in bacillary dysentery. As in other febrile conditions there is a tendency for the filtration of the chlorides out of the serum into the surrounding tissues and in this respect vomiting and diarrhoea are decisive factors.

In 64 patients hypochloraemia was observed in 17 with a chloride content between 300 and 360 mgm per cent. These were Flexner dysenteries. The results suggest the necessity for salt replacement by the mouth. Water loss causes plasma concentration and salt loss may

this for not be apparent. Hypochloræmia can take place within 2-3 hrs. but may be deferred to the second week. During convalescence on the other hand frank hyperchloræmia is noted. Relapse and the superimposed complication such as dysenteric arthritis lead to a further chloridæmia.

In 15 fatal dysenteries either no alteration in the chloride content or a moderate hyperchloræmia was observed. It is assumed that this is due to toxic inhibition of some endocrine regulation of chloride metabolism.

The indication arises therefore that by judicious diet in food and drink the chloridæmia may be averted. Intravenous injection of physiological saline in 10-20 per cent solution in amounts of 20-40 cc may therefore be given with benefit. *I. MacIsaac, I.A.S.*

POOLER (L. T.) Dysentery and Diarrhoea in Wartime—*J. Int. Med. J.* 1942 Oct 10 p 438

Pooler points out that the standard and standardized anti-Shiga serum now used by the Army contains 50 000 International Units in a volume of less than 10 c.c. and that 50 000 to 100 000 I.U. are considered sufficient to neutralize a fulminating case. Intravenous injection is preferable to intramuscular and is a result of the use of protokollin in the preparation of the serum. The risk of anaphylaxis is so small that it need not be regarded as a deterrent to the intravenous route. *C. H.*

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

DOBELL (Clifford) Some New Methods for studying Intestinal Amoebae and other Protozoa—*Parasitology* 1942 May Vol 34 No 1 pp 101-111 With 31

In his investigation of the intestinal protozoa of monkey and human beings the author has adopted with advantage an old technique by laying a cover glass on the surface of the old loop of imprinted rumen or caecum beneath the liquid portion of the medium used for cultivation of amoebae. The attached amoebae on to the surface of the cover glass which can be removed and dropped in the case of smear on the surface of the fixative. By this means are obtained excellent preparations of the free intestinal amoebae found in their natural form during movement. Specially adapted cover glasses and instruments for handling them are required. These and the various manipulations are described in detail with the aid of a number of figures.

The paper further describes a staining method which have been modified for amoebae and other protozoa. Like the well known iron haematoxylin method both the main use of mordants but they have the advantage that after staining is completed there is no necessity to differentiate the film in the mordant solution as over staining does not occur. One of the methods—the tungstic haematoxylin method—involves the use of a 2 per cent solution of phosphotungstic acid. In this strength of mordant films are left for ten minutes or

longer. They are washed in several changes of distilled water to remove excess of acid and then placed in a ripened 0.2 per cent aqueous solution of haematoxylin for 15 to 30 minutes or longer. They are then kept in tap water till purple and mounted in the usual way. In the second method—molybdic haematoxylin method—the mordant is a 2 per cent solution of ammonium molybdate. The staining procedures are the same as in the first method. Though these staining methods are evolved by the author for the study of amoebae and other intestinal protozoa they are of general application and will be found useful for staining sections as well as films and for vegetable as well as animal tissue. Three outline drawings from films of the common intestinal amoebae of man illustrate the good results obtained by the techniques described.

SAPERO (James J.) HANSSON (Erik G.) & LOUITT (C M) *The Occurrence of Two Significantly Distinct Races of Endamoeba histolytica*—*Amer J Trop Med* 1942 May Vol 22 No 3 pp 191-208 With 3 figs [17 refs]

From a study of the cysts of *Entamoeba histolytica* from 99 cases of infection with this amoeba the authors have demonstrated the existence of large numbers of strains having mean diameters intermediate between and beyond the five races postulated by DOBELL and JEFFS in 1918. These strains reveal a marked degree of overlapping in size distribution do not show size constancy and differ from one another in no other respect than that of size alone. On this account they cannot be designated as races of *E. histolytica*. A further analysis of individual strains and of the pooled distribution of 7495 cyst measurements from 320 cases demonstrates the existence of two distinct races—one of large and the other of small cysts. These are distinctly unlike in size and differ in other respects—motility, cultivability, pathogenicity in man and experimental animals. The dividing line between these races is 10 microns for living cysts or nine microns for fixed and stained cysts. The evidence which the authors have reviewed in the paper indicates a racial constancy both as regards the size and the physiological characteristics exhibited by the two races of *E. histolytica*. The free forms of the small race have not been shown to ingest red blood corpuscles and are less vigorously motile than those of the large race while the cysts and the free forms are more uniform in size than those of the large race. The small race is less readily cultivated than the large race while it is definitely less pathogenic to kittens. Tissue invasion in man by the small race has not been demonstrated nor has it been shown to be the cause of dysentery or other serious clinical condition.

D'ANTONI (Joseph S) *Amoebic and Bacillary Colitis in the New Orleans Area*—Preliminary Report—*Amer J Trop Med* 1942 July Vol 22 No 4 pp 319-324 With 1 fig

The routine employed in suspected cases of amoebic or bacillary dysenteries has been. A saline cathartic is administered on retiring and a sample of faeces is collected the following morning after 6 a.m. One and a half hours before sigmoidoscopy an enema of physiological saline is administered. After evacuation the saline enema is repeated.

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P. Manson Bahy

POOLE (L. T.) Dysentery and Diarrhoea in Wartime—*Brit. Med. J.* 1942 Oct 10 p 434

Poole points out that the refined and standardized anti Shiga serum now issued to the Army contains 50 000 International Units in a volume of less than 10 cc and that 50 000 to 100 000 I U are considered sufficient for an initial dose in fulminating cases. Intravenous injection is preferable to intramuscular and as a result of the use of proteolytic enzymes in the preparation of this serum the risk of anaphylaxis is so small that it need not be regarded as a deterrent to the intravenous route.

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AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

DOBELL (Clifford) Some New Methods for studying Intestinal Amoebae and other Protozoa—*Parasitology* 1942 May Vol 34 No 1 pp 101-112 With 5 figs

In his investigation of the intestinal protozoa of monkeys and human beings the author has adapted with advantage an old technique by laying a cover glass on the surface of the solid loop of an intestinated animal. The amoebae move on to the surface of the serum or egg beneath the liquid portion of the medium used for cultivation of amoebae. The amoebae are removed as in the case of cover glasses which can be removed and dropped as in the case of meat on the surface of the fixative. By this means are obtained excellent preparations of the various intestinal amoebae fixed in their natural form during movement. Specially shaped cover glasses and instrument for handling them are required. These and the various manipulations are described in detail with the aid of a number of figures.

The paper further describes two staining methods which have been modified for amoeba and other protozoa. Like the ell and iron haematoxylin method both the involve the use of mordants but they have the advantage that after staining is completed there is no necessity to differentiate the films in the mordant solution as in the staining does not occur. One of the methods—the tetrachrome method—involves the use of a 2 per cent solution of photostatic acid. In this strength of mordant films are left for ten minutes or

longer. They are washed in several changes of distilled water to remove excess of acid and then placed in a ripened 0.2 per cent aqueous solution of hematoxylin for 15 to 30 minutes or longer. They are then kept in tap water till purple and mounted in the usual way.

In the second method—molybdic hematoxylin method—the mordant is a 2 per cent solution of ammonium molybdate. The staining procedures are the same as in the first method. Though the staining methods are evolved by the author for the study of amoebae and other intestinal protozoa they are of general application and will be found useful for staining sections as well as films and for vegetable as well as animal tissue.

Three outline drawings from films of the common intestinal amoebae of man illustrate the good results obtained by the technique described.

C. M. Henry

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Sigmoidoscopy performed the mucosa in expected areas a pirated
introduced and material from expected areas a pirated
Fourteen patients positive for *E. histolytica* were studied. In 8 the
organism was recovered from the purgative and enema specimen.
In only one only. Both a pirated material purgative and enema specimen
were positive in two. In four *E. histolytica* was recovered only from the
a pirate. The failure to detect *E. histolytica* in material a pirated
from the rectum commented on. Treatment of amoebiasis was
with Diodoq in three tablets three time daily for 10 day was
inefficient and the course was increased to 20 days. A minimum of
three negative stool specimens obtained two week after completion of
treatment was the criterion of cure. In one case out of a series of 38
the treatment failed. Thirty two individuals harbouring *Shigella*
(dysentery bacilli) were detected. In 28 the intestinal mucosa showed
reddened granular patches usually 2-4 cm in diameter. In
four it mutilated aryle rati colitis. Sonne's bacillus was the most
frequent cause of bacillary dysentery in New Orleans. It is stated that
sulphag and neomycin of value in the cure of acute bacillary dysentery
but failed in four out of five cases of *Shigella colitis*. P. Manson Balr

ORMISTON (G) TAYLOR (Joan) & WILSON (G S) Enteritis in a
Nursery Home associated with *Giardia lamblia*—*Brit Med J*
194 Aug 8 pp 151-154 [15 ref] [Summary appears
also in *Bulletin of Hygiene*]

There was an outbreak of chronic diarrhoea in a nursery home for
children between July 1940 and May 1941. Attacks started acutely
with vomiting dehydration loss of weight and pyrexia which
passed into a chronic phase with watery mucus-containing stools
poor nutrition and an anaemia with mild leucopenia. 28 out of 31
infants died out of 10 adult were affected. The adult patient
complained in addition of colicky pain giddiness weakness anorexia
and headache. There were two deaths among the infants. No
pathogenic organism was isolated except *Giardia intestinalis* (G
lamblia) which was found in the stools of 8 per cent of those who had
or had had diarrhoea and in only 5 per cent of those who had not.
Quinacrine (atebrin) [mepacrin] the British equivalent produced
a rapid and complete cure with disappearance of the *Giardia* and
recovery from the symptoms. It is given in tablet form 0.1 gm
three times a day for five days. Infant under 10 years old were given
one sixth of the dose. A second course of treatment was given four
days later for relapse.
It seems likely that *Giardia* may be a more common cause of diarrhoea
than is suspected especially of chronic non-specific cases appearing
in the winter. Charles Newman

PANT (K C) & RAY (H N) Quinacrine in the Eradication of *G. lamblia*
lamblia infection—I *Ind Med Ga* 194 Aug Vol 77 No 8
pp 469-470

RELAPSING FEVER AND OTHER SPIROCHAETOSSES

ADLER (S) & ASHBEL (Rivkah) The Behaviour of *Spirochaeta persica* in *Pediculus humanus*—*Ann Trop Med & Parasit* 1942 Sept 30 Vol 36 No 3 pp 83-96 [11 refs]

A description of experiments to determine whether the Palestinian strain of relapsing fever *Spirochaeta persica* usually transmitted by the bite of the tick *Ornithodoros tholozani* could also be transmitted by *Pediculus humanus*

The histories of 65 cases of the disease showed that in the great majority the first attack occurred within 10 days of a visit to some cave where ticks are liable to occur but four required the infection in the Old City Quarter of Jerusalem and the possibility of louse transmission had to be considered. Infectivity for guinea-pig is a simple practical test for distinguishing between tick and louse-borne spirochaetes whenever *S. recurrentis* has been tested it has been found non infective for guinea-pigs. Out of 42 strain of spirochaetes in Palestine and Syria 40 produced a heavy infection in guinea-pigs one was only slightly infective and one was almost non infective. All the strains examined were uniformly infective for rats.

Five strains of spirochaetes all from human cases were investigated and showed considerable diversity in different strains of lice. When ingested by lice in large quantities the spirochaetes all disappeared and inoculation of the lice into susceptible animals gave negative results. When inoculated into the coelom of the louse they survived for various periods one strain for less than 24 hours a second strain up to three days and a third strain up to seven days. One strain of spirochaete however when ingested by lice survived up to 10 days as proved by inoculation into susceptible animals. In no case was there any evidence of multiplication in the coelom of infected lice.

The gradations in the length of survival of the spirochaetes in the louse is in accordance with NICOLLE and ANDERSON'S suggestion [see this *Bulletin* 1927 Vol 24 p 77] that the contemporary strains of *S. recurrentis* were originally derived from tick transmitted strains. Up to the present however no tick strain capable of multiplying in the coelom of lice has been discovered. In Palestine where tick transmitted relapsing fever is endemic not a single case of undoubted natural louse transmission has been seen during the past five years.

A strain of *S. persica* was rapidly destroyed in the monkey louse *Pedicinus eurygaster* although in one experiment infection resulted when specimens were removed from a monkey whose blood was swarming with spirochaetes and immediately inoculated into another monkey. Similar experiments with guinea-pigs gave negative results.

E Hindle

ASHBEL (Rivkah) Observations on Some Strains of *Spirochaeta persica* in Palestine—*Ann Trop Med & Parasit* 1942 Sept 30 Vol 36 No 3 pp 97-101

A study of the behaviour of 17 strains of *S. persica* in 110 guinea-pigs which had each recovered from infection with a single strain with special reference to the period of survival in the brain.

At varying intervals up to 840 days after the blood was finally negative the animal was killed and the whole brain emulsified and inoculated into normal guinea-pigs. With one strain positive results were obtained 398 days after apparent recovery and with other strains

from 117 to 264 days. Ten animals 400 to 804 days after recovery were negative. Also in some cases after slight infections the brain was negative as soon as 31 to 60 days after the blood infection.

No immunological changes were observed in the spirochaetes as a result of repeated passages through rats and guinea-pigs. The authors found that relapses in human beings can occur both with and without immunological changes in the spirochaete even in the same individual as shown by the results of cross infection experiments.

In some cases a relapse strain protects completely both against itself and against the original strain though the original strain does not protect against the relapse strain. This indicates the presence of antigens common to both strains and new antigens in the relapse strains.

These mutations in spirochaetes have been observed not only as a result of passage through man but also in monkeys and in one instance the tick *Orrhodorus tholozani*. E. Hindle

TRIARCHI (Michelangelo). Su un caso di pseudo addome acuto da ricorrente. [A Case of Relapsing Fever in which the Acute Abdomen was Simulated].—*Boll. e Soc. Ital. di Med. e Ig. trop.* (See Brit. J.) 1942. Vol. 1. No. 2. pp. 93-95. English summary (5 lines).

MOUSTARDIER (C.). Premier cas de sodoku observé en Afrique Equatoriale Française. [The First Case of Sodoku observed in French Equatorial Africa].—*Rev. Sci. Méd. Pharm. et Hyg. et de l'Afrique Française Libre*. Brazzaville 1942. July. Vol. 1. No. 1. pp. 5-15. With 1 chart.

The record of a fatal case of rat bite fever occurring during 1940 in a European at Brazzaville who was bitten by a rat.

After an incubation period of 15 days the patient developed febrile symptoms which lasted four or five days. This was followed by an interval of five days after which the temperature again rose to 40°C. In view of the clinical picture and history of the case treatment with novarsenobenzol was started and the patient's blood was inoculated into guinea-pig and white mice which subsequently showed the presence of *Spirillum minus* in the peritoneal cavity. [See below.]

In spite of all treatment the patient's condition gradually got worse. haemorrhagic symptom developed and he succumbed after an illness of about five weeks.

[This paper apart from its subject matter has the additional interest of being the first article in a new journal published in Brazzaville by the Free French in Africa. The Bureau would like to join General SICÉ in wishing it every success.] E. Hindle

CECCALDI (J.) & GUILHAUMOU (I.). Isolement d'une souche humaine de *Spirillum morsus muris* à l'occasion du premier cas de sodoku observé en Afrique Equatoriale Française son étude. [The Isolation of a Human Strain of *Spirillum morsus muris* from the First Case of Sodoku observed in French Equatorial Africa. Its Study].—*Rev. Sci. Méd. Pharm. et Hyg. et de l'Afrique Française Libre*. Brazzaville 1942. July. Vol. 1. No. 1. pp. 16-38. With 9 charts. [16 refs.]

A description of a strain of *Spirillum minus* isolated from the blood of a European in Brazzaville 28 days after he had been bitten by a rat.

Two mice inoculated with the blood showed spirilla after 12 and 13 days respectively and 1 guinea-pig after 17 days.

The pathogenicity of the strain was tested in mice guinea-pigs rabbits three monkeys belonging to different species of *Cercopithecus* a dog cat and fowls all of which were susceptible. With regard to mice one of the infected individuals gave birth to three young 24 days after being inoculated. Although spirilla were seen repeatedly in the blood of the mother the three young remained negative and showed no other signs of infection.

The rabbit was found to be particularly susceptible and in this animal the infection became generalized. *Cercopithecus neglectus braisiformis* and the fowl were also susceptible. These facts suggest that the strain possessed a very high virulence. Attempts to cultivate the organism on Reiter and Ramme's medium were unsuccessful. When inoculated into guinea-pigs simultaneously with *Trypanosoma gambiense* the appearance of trypanosomes in the blood was delayed suggesting an antagonistic action between the two infections. [See this Bulletin 1942 Vol 39 p 345] *E. Huxley*

VITTI (F) BOYER (F) & COAGE (M) Action du *p* amino phényl sulfamide dans le nodoku expérimental du cobaye [The Action of *p* amino phenyl sulphamide in Experimental Rat Bite Fever] —*Ann Inst Pasteur* 1942 Sept-Oct Vol 68 Nos 9-10 pp 497-498

The authors report promising results in a small series of experiments. C II

LEPROSY

BRITISH EMPIRE LEPROSY RELIEF ASSOCIATION (INDIAN COUNCIL)
Annual Report 1941 [COTTER (E) Chairman Governing Body] —
75 pp With 3 figs on 2 plates Calcutta Baptist Mission Press

1 *Report of the Governing Body* — This report deals firstly with the work of the central committee in the control of research work at Calcutta Leprosy Research Department. Papers on this work have already been reviewed in the *Bulletin* and are concerned mainly with investigations of the lepromin test and with epidemiological studies at the Bankura centre and elsewhere.

2 *Report of Committee of Central Advisory Board of Health of Government of India on Leprosy and its Control in India* — This is the first such enquiry since the Leprosy Commission of 1890 on which the Indian Leper Acts of 1898 was based. At the time was fully ripe for its work. The following findings are summarized in the report. The formation in 1925 of the Indian branch of B.E.L.R.A. greatly stimulated interest and work on leprosy. The 1931 census figure of 150,000 cases is only about one eighth of the actual number when early cases are included. In some areas the incidence may be 5-10 per cent. The charitable money given by the people to begging lepers would go a long way towards financing effective measures for the control of the

di et c. Such social defects as overcrowding bad housing debilitating diseases of tract and ignorance on health matters make the problem largely an economic one. Instruction on leprosy in the medical curriculum is deficient and medical institutions often refuse to treat leprosy patients. The central Government interests itself in research and the provincial health authorities in anti-leprosy work. The Mission to Lepers in institutions are giving increasing attention to training in anti-leprosy work and in treatment. Treatment plays a larger part than clinical results alone would indicate but better staffing of clinics is desirable. Infective cases in India are roughly estimated at 250,000 and only about 14,000 are accommodated in institutions including a large number of uninfected crippled nerve cases. It is advised that the latter should be dealt with separately from the infective class and a large increase of accommodation for the latter should be provided by the provincial authorities. In isolation at home the most important aim is the protection of children from infection. Leprosy clinics have the advantage of cheapness and under a keen specially trained doctor they do good work. Some of the best clinics are attached to in-patient institutions. The voluntary system of isolation should be relied on as hitherto except in the case of beggars and of infective patients unwilling to isolate themselves. In patients cost at least 12 rupees per head per month (£10 to £11 a year). Every province should have a central model leprosy institution as the hub of anti-leprosy activities. [This was advocated by the reviewer at a Calcutta Leprosy Conference in 1920.]

3 *Part 2. Reports of Provincial and State Branches*—The following points are of more than local interest. In Madras the Government have accepted the principle that treatment of leprosy patients shall be provided at all hospital and dispensaries. Investigations are carried out under the direction of Dr R. COCHRANE at the Lady Willingdon Leprosy Sanatorium. They deal mainly with the disease in children. More than 50 per cent of nerve cases show improvement over a period of four years. In one village nearly all the infective cases are isolated locally. The Madras province has 470 leprosy clinics. Benal has 139 and surveys in the latter revealed that of persons examined 0.44 per cent of children, 4 per cent of the police force and 2.2 per cent of prisoners in the jails examined showed signs of leprosy, practically all in a mild form. A survey in Calcutta showed nearly 1,000 beggar lepers and a total estimate of nearly 10,000 cases in the general population. In the Central Provinces and Berar there are eleven in-patient institutions most of which have now agreed to take in only infectious cases, an important advance which other provinces might imitate. Out-patients are treated at 31 clinics and 58 sub-centres. In some areas home isolation is attempted by the people. Orissa has a high leprosy incidence for which two in-patient institutions and 147 clinics are provided. Surveys have already enumerated about 10,000 cases. The United Provinces have a lower incidence [and lower rainfall] two in-patient institutions and a number of hospital and skin clinics care for the cases. The Punjab is lightly affected except in the hill areas as the Kangra Valley. Five leper homes and 180 treatment centres are at work and surveys are carried on. Bombay has 14 leprosy institutions and 46 treatment centres. Bihar is another area with a high incidence of leprosy, there are 9 in-patient institutions, 21 special leprosy clinics and 29 attached to hospitals. A survey revealed 2.4 per cent of the population to be infected.

I. Peters

GEHR (Emmo) Die Lepra in den Balkanländern [Leprosy in the Balkans]—*Deut Trop Ztschr* 1941 June 15 & July 1 Vol 45 Nos 12 & 13 pp 353-369 385-403 With 11 figs [125 refs]

This and the following paper are written in continuation of the attempts made in two earlier papers by the same authors [see this *Bulletin* 1940 Vol 37 p 626] to support the speculation of OBERDORFFER and GEHR [see this *Bulletin* 1941 Vol 38 p 22] that the history of leprosy in Europe and its present incidence in that and other parts of the world can best be explained on the supposition that most leprosy infections arise as the result of the predisposing action of sapotoxins contained in colocasia (yams) in warm climates or corn-cockle in Europe both common articles of diet. The paper opens with a statement that the inquiry into the epidemiology of leprosy in the Balkans has been made to ascertain if it corresponds to Oberdorffer's views.

The incidence of leprosy in Greece is first dealt with and is illustrated by a map. Other maps showing climatic conditions are given. The well-known high incidence in Crete and some other islands and the lower rates on the mainland are pointed out. The total known cases are given as 758 and the distribution of 700 of these is tabulated. There are 279 or one third in Crete and five events in all the Islands leaving 195 on the mainland mainly in the Peloponnese. The males number 370 and females 330. 367 are interned and 333 remain free. A table of occupation shows 150 peasants and 40 labourers including 10 workers with tobacco as the largest classes. There were further cases in the families of 167 out of 700, the relationships being shown in another table, the most frequent being in brothers and sisters in 40 per cent and parents in 41 per cent. The people are mostly very poor and 5 to 8 persons may sleep in one room. The tobacco-growing areas have fewest cases. Beriberi is unknown. A lack of vitamin B₁ is excluded as a predisposing cause. The peasants live largely on vegetables and consume little meat and it is stated that their bread may contain as much as 8 to 10 per cent of corn-cockle seed. Other predisposing factors are discussed and the author excludes to his own satisfaction all the predisposing causes of leprosy recognized by other workers including climatic conditions, poverty, overcrowding, unhygienic conditions, infection with malaria and other debilitating diseases. The expected conclusion is thus arrived at that only the consumption of apotoxin-containing foods accounts for the distribution of leprosy in Greece and the other Balkan States and that it acts by injuring the endocrine function of the body. Thus it will be recalled was the hypothetical basis of treatment with diphtheria toxoids on which Oberdorffer and his colleagues in Thailand relied which has failed in the hands of others and for which no pathological basis has been demonstrated. Only brief consideration is given to leprosy in the other Balkan countries including the following numbers known in each: Rumania 140 with an estimate of 500 to 600; Bulgaria seven cases; Yugoslavia 593 and Montenegro 160. One hundred and twenty-five references to literature are given, the few do not include the paper by LOWE and CHATTERJI [this *Bulletin* 1939 Vol 36 p 1015] in which those authors record facts in disagreement with Oberdorffer.

L. Rogers

GEHR (Emmo) & GEHR (Elizabeth) Die Lepra in Spanien und Portugal [Leprosy in Spain and Portugal]—*Deut Trop Ztschr* 1941 Nov 15 & Dec 15 Vol 45 Nos 22 & 24 pp 673-685 721-730 With 7 fig [64 refs]

The introduction argument and conclusions of this paper are similar to those of the above on leprosy in the Balkans only the data regarding the prevalence of the disease therefore require brief mention as they are very similar to those of previous authors on this subject. The known cases number 928 of which 486 or 52.4 per cent are isolated mostly at Fontilles in Alicante province. The health authorities estimate the total number at from 2 500 to 2 000 and a dermatologist puts them at 6 000. The disease is most frequent in the Southern and Mediterranean provinces and in Galicia in the north west of the peninsula. The classified cases show 344 to be nodular 125 nerve and 245 of a mixed type. A table of the vocations of the patients shows the largest numbers to be peasants 157 house workers 112 and day labourers 74.

The second part of the paper deals with the incidence of leprosy in Portugal. A table of known cases shows the distribution of 1 14 cases of which the highest number 234 or 0.6 per mille of population are in the Coimbra district. The true total has been estimated at 3 000 to 4 000. A number of cases occur in persons who have returned from Brazil.

L. Roers

HELMINTHIASIS

ERHARDT (Albert) Chemotherapeutische Untersuchungen mit 430 Kl einem Spezificum mit grossem therapeutischem Index gegen die Ancylostomiasis Trichuriasis Ascariasis und Taeniosis (Taenia und Dipylidiuminfektion) der Katz [Chemotherapeutic Researches with 430 Kl a Specific with a High Therapeutic Index against Ancylostomiasis Trichuriasis Ascariasis and Taeniosis (Taenia and Dipylidium Infection) of the Cat]—*Deut Trop Ztschr* 1941 Aug 1 Vol 45 No 15 pp 443-456 [11 refs]

While testing a large number of preparations made by Knoll A. G. of Ludwigshafen am Rhein Erhardt found that the substance called 430 Kl the nature of which is not specified was a specific with a high chemotherapeutic index for all the intestinal helminths of the cat and he refers to it as a universal worm remedy. He says that LAMSON BROWN and HARWOOD in 1934 [this Bulletin 1935 Vol 3 p 237] tested a similar substance *in vitro* on *Ascaris lumbricoides* of the pig a method which is not in Erhardt's opinion useful for the discovery of anthelmintics.

All Erhardt's experiments were done on cats with chronic natural infections. Helminths such as *Opisthorchis* in the liver and pancreas of the cat and *Strongyloides* in its intestinal wall and helminths which are in the tissues are not affected by 430 Kl which is not absorbed into the blood. A later paper will describe its action on *Oxyuris* of rabbits. The action of the drug was tested by making egg counts on 24 hour samples of faeces from an emulsion of which 0.075 cc were put into Zschucke's counting chamber the eggs in this being counted so that

the total number of eggs passed during the 24 hours could be estimated. The drug was always given with trigonanth and water by means of an oesophageal sound. The lethal dose was 2 cc per kgm.

The results of the treatment of 22 cats infested with *Ancylostoma caninum* showed a chemotherapeutic index of 1.20 which is a great advance on known anthelmintics. The worms were killed within 24 hours. The lowest effective dose was 0.1 cc per kgm and this could result in eradication of all the worms although 0.2 cc per kgm killed only 80 per cent of the worms in some cases.

Nine cats were treated for infestations with *Trichuris serrata*. The lowest effective dose was 0.05 cc per kgm which killed all the worms giving a therapeutic index of 1.40. This is noteworthy because *Trichuris* resists worm remedies.

Toxocara cati was treated in 47 cats. The lowest effective dose was 0.5 cc per kgm which killed all the worms in over 50 per cent of the cats giving a therapeutic index of 1.40.

Taenia taeniaeformis was treated in 22 cats. Doses of 0.1, 0.2 and 0.5 cc per kgm killed all the worms giving a therapeutic index of 1.20. Only eight cats infested with *Dipylidium caninum* were available but in these the chemotherapeutic index was also 1.20.

Dead worms of all these species were found after treatment in the gut or in the faeces but the author does not state how he decided that they were dead although some of the ascarids in the faeces were he says partially digested.

G. Lapaš

EICHHOLTZ (T) & ERHARDT (A) Wurmmittel Der Nachweis ihrer Spezifität im chemotherapeutischen Versuch unter besonderer Berücksichtigung des Phenolabkommings 430 Kl (Knoll) [Anthelmintics The Proof of their Specificity by Chemotherapeutic Experiment with Special Consideration of the Phenol Derivative 430 Kl (Knoll)]—*Dtsch Trop Ztschr* 1942 June 1 Vol 46 No 11 pp 275-284 [25 refs]

In 1927 Eichholtz discovered a derivative of resorcin named E 1750 which seemed to have a good effect on ascarids of the cat. It is closely related to hexylresorcinol introduced almost simultaneously in America by LAMSON and his co worker. E 1750 was tried by ZSCHÜCKE in Fernando Po and by ZSCHÜCKE and SZIDAT and WIGAND on man in the worm infested regions on the borders of the Curiche Haff near Königsberg on the Baltic. It had a very good curative effect on *Necator Ancylostoma* and *Ascaris* of man but it was only 50 per cent effective against *Trichuris* of man and was no use against tapeworms especially *Dipylidobothrium*. It was therefore not the universal anthelmintic desired. The end product of fifteen years of work by Eichholtz and Erhardt and their co workers is the phenol derivative 430 Kl. During this fifteen years of work they have used cats as test animals having come to the conclusion that dogs are not suitable and still less the so called *in vitro* method. The helminth infestations of dogs are not established firmly enough. Even change of diet or simple remedies such as turpentine which are quite inactive in man will remove many species of helminths from dogs while the intestinal parasites of cats are difficult to eradicate. After 15 years of work with cats they think that *Ancylostoma caninum* is primarily a parasite of cats and only secondarily one of dogs. They

found that the cats of some villages of one Heidelberg district were heavily infested with *Ancylostoma caninum*. In 1933-1937 Erhardt using his new test methods for ankylostomiasis found that only 10.3 per cent of the cats in these districts were infested but to-day nearly 100 per cent have the infestation.

The remedies tried in order of effectiveness are as follows —

Drug	Therapeutic Index	Lethal dose per kgm cats	Therapeutic dose per kgm cats	Full therapeutic dose (man) [not per kgm]
430 I I	1 10-1 20	2 cc	0.1-0.2 cc	Not known
E 1750	1 4 [1 6 in table I]	4 gm	0.4 gm	3-6 gm
Film on 0.1 10 per cent	1 2 1 6 6	3-10 cc	1.5 cc	10-20 gm

Only these three drugs would kill 100 per cent of the ancylostomes when they were given in therapeutic doses. To kill 100 per cent of ancylostomes with a caridol toxic doses were required and a kill of 100 per cent was not possible with carbon tetrachloride, tetrachlorethylene or thymol. Santonin and Lubisan were completely inactive against ancylostomes of the cat.

Comparing the results with those obtained in human ankylostomiasis the authors conclude that in general the results obtained with the cat apply also to man but the relatively feeble action of carbon tetrachloride, tetrachlorethylene, thymol and hexylresorcinol on the hookworms of cats shows that they are more difficult to kill and remove than the ankylostomes of man. This is one reason why it is an advantage to use the cat as a test animal because it prevents overestimation of the action of a drug and avoids estimating its activity on infestations with species that are not firmly established.

Human and cat ascarids are relatively easily removed. In cat ascaridol, santonin and 430 I I are specific against ascarids (*Toxocara*). Ascaridol is also active against *Ancylostoma* and to a lesser degree against *Enterobius* while santonin acts only on the ascarids. Tetrachlorethylene, E 1750 and hexylresorcinol are less useful against ascarids and carbon tetrachloride, thymol and Lubisan are only feebly active against them. Filmaron is completely inactive even in doses of 10 cc per kgm.

In man as in cats ascaridol and santonin seem to be the most active drugs against ascarids. Hexylresorcinol, E 1750 and tetrachlorethylene are less useful while thymol, carbon tetrachloride and Lubisan act only feebly. It is thus not too risky to apply the results obtained with ascarid infestations of cats to those of man but it is not wise to compare the *Taenia* infestations of man and cats because cat tape worms are easily expelled, the Filmaron therapeutic index being, for example, strikingly higher in cats than in man and E 1750 having a therapeutic index of 1/24 in cats while it is no use for *Taenia* infestations of man. Filmaron is a specific against *Taenia* of cats. After 0.25 cc per kgm 100 per cent of this species are killed and expelled with the scolices while after 0.1 cc per kgm the worms are expelled without the scolices.

and the first 2-3 cm of the proglottid chains. L 1750-430 kl tetra chloroethylene, thymol and hexylresorcinol were less active and carbon tetrachloride, santonin and Lubisan were quite inactive.

To find a universal anthelmintic herbivora as well as carnivora must be studied. The relative shortness of the gut of cats may lead to too high an estimation of remedies which might be less effective in the longer guts of man and herbivora. For this reason a study of the action of the drugs mentioned on the oxyurid *Passalurus ambiguus* of the rabbit was undertaken. Further human reactions to toxicity are more like those of the cat than those of the rabbit and herbivora are much less sensitive to toxicity. All the drugs mentioned above had a small therapeutic range against this oxyurid. Lubisan was the best of them. Other so called remedies for oxyuriasis (Helminal, Butolan, aluminium acetate and Pyrethrum extracts) were all inactive or practically so against *Passalurus ambiguus*.

The authors claim that their results show that santonin alone shows an absolute specificity being active against ascariids only. Most of the other drugs mentioned above acted on two or three species of helminths and were therefore only relatively specific. For helminths of the cat 430 kl is a universal remedy, but among its disadvantages are the facts that it is chemically unstable, has an almost intolerable taste and markedly irritates the buccal and pharyngeal mucous membrane just as resorcin derivatives do.

The authors express the hope that drugs will be found which are more active against *Ancylostoma* and *Enterobius* and are less toxic.

G. Lapage

DE PAULA (Hermes) Incidencia de verminose em escolares [Incidence of Helminths in School Children of Montes Claros Minas Gerais]—*Brasil Medico* 1942 May 23 & 30 Vol 56 Nos 21 & 22 pp 271-272

MINNING (W.) Immunbiologische Nachweismethoden bei Bilharzio sen [Immunological Methods for the Diagnosis of Bilharzia]—*Deut Trop Ztschr* 1941 June 1 Vol 45 No 11 pp 321-323

Complement fixation and skin tests can be of considerable value for the diagnosis of isolated cases of bilharzia in Germany and of infestations which have existed for a long time although eggs cannot always be found but precipitin reactions are not.

Two kinds of antigen can be used namely extracts of mature schistosomes in alcohol or salt solution and extracts of the digestive glands of snails infested with the larval forms. Extracts of the organs of the final host while it is harbouring the eggs and the products of intestinal reaction to the parasite could also be used but such an extract from the livers of experimental animals proved to be useless.

Worm extracts are not practicable because of the difficulty of getting enough mature worms. Worm extracts in salt solution have a sufficient titre and are also specific but the titre falls rapidly when phenol is added so that they cannot be used for long (see note below). Alcoholic worm extracts also have a constant and sufficient titre but they tend to give pseudo positive reactions.

Extracts of the digestive glands of snails give good results and there is no great difficulty in getting infested snails in bilharzial regions.

Only the alcoholic extract is useful. FAIRLEY found that its active constituent is a lipoidal complex and Fairley quantitative complement estimation makes possible accurate observation on the variation in the antibody titre. Fairley thinks that it is a true antibody antigen reaction. Munnir by repeated injections of the extract of the digestive glands of infected nail in a normal goat was able to obtain positive complement fixation and in infected goat a leap up in the complement fixation titre. Rhesus monkey into which the substance of schistosomes was injected for eight months was not positive but it is known that different experiments can behave differently as regards antibody formation in active immunization. Work on infected monkey also showed that there is no parallel between the titre of the complement fixation and the degree of acquired immunity against *S. japonicum*.

The complement fixation reaction has a marked group specificity within the genus *Schistosoma*.

Munnir used alcoholic extract of the digestive gland of *Platystrophia* guadalupensis (P. la rati) infected with *S. mansoni* and these reacted not only with sera from patient infected with *S. mansoni* but also with those of patient infected with *S. haematium* and *S. japonicum*. Extract of non-infected *Platystrophia* gave in both Fairley and Munnir or negative reaction with the positive sera. With the alcoholic extract monkey infected with *S. japonicum* were negative before infection but 2-3 weeks after infection they were positive the reactions reaching their highest point 2-3 months after when in spite of continued infection the titre fell until it was negative two years after the first infection. Out of 97 patients free from bilharzia, all but two were negative with these alcoholic extract and these two had positive syphilitic reaction. Only a few sera of patient suffering from bilharzia were available but two of these with active infection with *S. japonicum* showed a rise in titre at the same time as a rise in syphilis positive titre. Inactive *S. haematium* infection was a strong positive titre no egg could be found and after treatment the complement fixation capacity of the serum was markedly reduced. One with an active infection with *S. mansoni* a positive. Repeated test on sera of 19 patient who had been infected in 1934 were negative.

Skin test were more reliable than the complement fixation test. For these worm extract were made by Bozicevich method for making *Trichinella spiralis* antigen. In patient free from bilharzia there were no non-specific reactions. In bilharzia cases there appeared after injection dilution of 1 in 10 000 to 1 in 40 000 into the skin a primary reaction i.e. a weal 10-15 mm in diameter with marked redness round it. Only once was a secondary reaction seen after 24 hours.

Active cases of *S. haematium* infection and patient in whom egg could not be found reacted to 1 in 10 000 and so did cases of *S. mansoni* infection although some of these were negative to 1 in 10 000. The 19 cases mentioned above with negative complement fixation reactions which showed egg only at times reacted positive to dilutions of 1 in 20 000.

[Bozicevich makes *Trichinella* extract with saline and does not use Coca solution. Trawinski describes a similar method and thinks that the phenol in Coca solution causes false positive results. G. Lafaie

BIRD (Elton E) The Opossum *Didelphis virginiana* Kerr a New Host for *Paragonimus* in Tennessee—*Science* 1941 June 6 Vol 93 No 2423 p 542

Twenty specimens of a fluke identified tentatively as *Paragonimus estermanni* were found in the lungs of an opossum from a station in Tennessee. Byrd holds that there exists only one species of *Paragonimus* so far as is known the opossum has not previously been recognized as a host and the American opossum has in fact been found refractory to experimental infection C II

BACIGALUPO (Juan) Fasciola hepática L Su ciclo evolutivo en la Republica Argentina Distomatosis hepática [*F. hepatica* (Development)]—*An. Facul. de Vet. Montevideo* 1942 June Vol 4 No 1 pp 9-134 With 77 figs [52 refs]

GOTOR (P) El diagnóstico de la cisticercosis cerebral [The Diagnosis of Cerebral Cysticercosis]—*Rev. Clin. Española* 1942 Jan 30 Vol 4 No 2 pp 121-123 With 2 figs

The author has encountered two cases the first of which was described in the *Archivos de Neurobiología* (1939 Vol 10 p 147). The second is here described and the differential diagnosis is discussed. This patient was a boy aged 8 whose history revealed nothing of interest. His illness began three years before admission to the clinic after a series of attacks of headache and vomiting. A progressive loss of sight ended after three months in complete blindness an uncommon symptom of cerebral cysticercosis which in this patient might have been due to cysticercus toxins or to basal meningitis or eye lesions. Although the mother said that pieces of tapeworm had been passed treatment before admission to the clinic did not completely eliminate the worm but repeated examination at the clinic before during and after administration of filmaron failed to reveal tapeworms or their eggs. The intention to radiograph the patient precipitated in him a state of great excitement and a very atypical convulsive crisis recalling the tempest of movements described by KRETSCHMER. Similar attacks had occurred earlier but no evidence of epilepsy. There was some emotional instability suggesting hysteria. At most the patient exhibited attacks

Prolonged observation indicated that the symptoms had moderated but there was some exophthalmos and this was said to have been worse at the beginning of the illness. Midriasis nystagmus and simple atrophy of the papilla were present. The principal features of the blood examination were an eosinophilia of 3 per cent only a relative lymphocytosis of .42 [presumably 42 per cent] and a very strongly positive complement fixation reaction with cysticercus antigen. This reaction was negative with the cerebrospinal fluid. The Wassermann reaction was negative.

Only exceptionally have pieces of cysticercoid membrane or many small vesicles been found in the spinal fluid which usually shows high pressure and a picture differing little from that of chronic encephalomyelitis. In Gotor's first patient it showed a picture like that described by GUILLAIN PÉRON and THÉVENARD but in his second patient it was normal.

There is a tendency to attach too much importance to eosinophilia of the blood. BUSÉ found eosinophilia in only 50 per cent of his cases and the eosinophilia was not high the maximum both in his cases

and in the literature reviewed by SCHENCK was only up to 12 per cent but cases of Echinococcus infestation were included in the figures

Eosinophilia of the cerebrospinal fluid is much more decisive because there is no other disease of the nervous system which produces it Rizzo believes it to be the rule and gives it an extraordinary significance in cerebral cysticercosis but neither of Gotor's patients had eosinophilia in the blood or the cerebrospinal fluid his first patient showed it in the cerebrospinal fluid only after surgical intervention [the nature of which is not specified]

When eosinophilia exists the radiographic confirmation of the calcified cysts is of great value The two radiograms of Gotor's second patient obtained with the help of light narcosis are illustrated but the reproductions are not good They showed numerous typical calcifications which at first slightly recalled the brain of his first patient when the dura was opened In both patients the brain looked as if it had been peppered with small shot The shadows seen in the second patient were like those described by SCHULLER namely polyhedral shadows with an interrupted and hard contour and a homogeneous density though they were smaller than Schuller's Calcified brain tumours give shadows which are not homogeneous and have less precise contours ALBRECHT and others describe cysticercus shadow as being rounded clearly defined and about the size of peas The calcifications may be better seen elsewhere than in the brain e.g. they have been more clearly seen in the leg and the pelvis Calcifications may be absent throughout the patient's life MACARTHUR thinks that calcification begins only three years after the death of the parasite but this is no great obstacle to early diagnosis because according to MacArthur the clinical condition only begins after the death of the parasites when they swell and disseminate toxin The parasites may introduce bacteria which cause inflammatory changes and the site they occupy may be more susceptible to circulating viruses these viruses may kill the parasites themselves

Discussing conflicting views about the value of complement fixation in these cases Gotor claims that he excluded all errors due to chance and found that his first patient gave a positive blood reaction the second a very strongly positive one He concludes that taken together with the clinical peculiarities the eosinophilia and the radiograms complement fixation reactions are important aids to diagnosis [See also this *Bulletin* 1942 Vol 39 pp 468-704-705] G. Laplace

ARCE (J. E.) Hydatidosis of the Lung.—*Surgery Gynecol. & Obstet.* 1942 July Vol 75 No 1 pp 67-73 With 18 figs

TALLMAN (Ed. a. do) Quatre indat d'infestation [Hydatid Cysts of the Kidneys]—*Med. Mod. Valparaíso* 1942 Feb Vol 15 No 7 pp 330-334 With 4 figs

RIVAS (C. I.) & PERINETTI (Héctor) Quatre indat d'infestation de la glandula thyroïde [Hydatid Cyst of the Thyroid]—*Boletín de la Clínica Quirúrgica* Buenos Aires 1942 July Vol 18 No 47 pp 407-411 With 5 figs [In Spanish]

DINNIK (J. A.) & ZVEJEVA (N. S.) Un cas de parasitisme d'un cœdode de genre Raillietia Fuhrman chez un enfant en Caucase [Infestation with a Cestode (Raillietina) in a Child in the Caucasus]—*Med. Parazit. & Parasit. D. M. S. S. R.* 1940 Vol 9 No 5 pp 458-460 With 2 figs [In Russian]

WILKINS (E Gordon) A Simple Method of counting Hookworm Eggs
in Faeces—*Indian Med Ga* 1942 May Vol 77 No 5
pp 275-279 With 1 fig

Working in a small up country hospital in Ganjam where special apparatus is not available the author evolved a glycerin salt technique for counting hookworm eggs which requires only simple apparatus. The results obtained with it have not been compared with those obtained by other standard methods the merits of which the author recognizes but he had no opportunity of using Lane's apparatus. He believes that great accuracy cannot be attained by any method and claims that his method is accurate enough for clinical purposes. It is not intended for research workers.

A thick slide $75 \times 25 \times 1.7$ mm is cut into three equal pieces the two end pieces are cemented (Durofix cement serves well) to the ends of another slide leaving between them a space about 25 mm square over which another slide about 30 mm long may be laid to enclose a space of rather more than 1 cc capacity. A 1 cc pipette graduated in hundredths is cut into five short lengths each containing 0.2 cc. A piece of galvanized iron wire which will fit the bore of this pipette is cut into pieces four inches long one end of each being bent over to form a handle the other end being filed off square.

The stool is stabbed with a piece of pipette till it is filled to the 0.1 cc mark. It is pressed down and twisted till the faeces do not recede excess of faeces being cut off with a stick passed across the end of the tube. The outside of the tube is cleaned. Its narrow bore prevents the entry of coarse matter and wire gauze screens with their uncertain results are avoided. The faeces are pushed out with the piece of wire on to one of the prepared slides and 0.9 cc of a saturated solution of NaCl in glycerin is added slowly from a teated graduated pipette. The faeces are mixed with this solution with the wire which has been washed clean in the last drops of the glycerin salt solution. This direct transference of the measured volume of stool to the counting chamber minimizes loss of eggs. The faecal emulsion is then covered with the top slide and the preparation is put aside for 30 minutes to allow the eggs to float up to the under surface of the top slide. All the eggs in the area covered by the emulsion are counted (this should be done within two hours or the eggs will become crenated or translucent). The highest counts were obtained after leaving the preparation for one hour but the counts obtained after 30 minutes to two hours were only slightly lower. The count is then multiplied by 10 to give the number of eggs in each cc of stool. [Cf GORDON H McL and WHIT LOCK H V *Jl Council for Sci & Ind Res* 1939 Vol 12 pp 50-52 who introduced a similar slide easily made in the laboratory which has two chambers. On the top slide over each chamber 1 sq cm is marked out. There is thus no need to measure the volume of faecal emulsion put into each cell. A saturated salt solution is used. Statistics are counted. The amount of stool examined is eight or ten times that examined by ordinary coverslip preparations of the same size. The eggs of other roundworms and of tapeworms are also seen. [An editorial note points out that a saturated solution of NaCl in water will not buoy up eggs of *Taenia* by floatation or DCF although eggs of *Hymenolepis* are floated up by such a solution.] The glycerin salt solution has a

specific gravity of 1.2964 which is higher than that of pure glycerin (1.259-) or of a saturated aqueous solution of NaCl (1.1960) or of a saturated solution of NaCl in any proportions of glycerin and water [Cf SAWITZ this *Bulletin* 1942 Vol 39 p 771 on the buoyancy of Nematode egg in solutions of various specific gravities] The concomitant floatation of debris did not cause any trouble. The glycerin salt solution seemed to float up eggs better than solutions of magnesium sulphate or zinc sulphate. It is claimed that the tables given of three separate counts on each of 16 stools show that no single count varies so much from the average as to give a totally misleading clinical picture. The highest recorded count was 10,500 but very heavy infestations were not common in the area where the author worked.

Wilkins grades his case estimated by this method into light infestations with counts in tens (10-90 eggs per cc), moderate infestations with counts in hundreds (100-990 eggs per cc), heavy infestations with counts in thousands (1,000-9,900 eggs per cc) and very heavy infestations with counts of 10,000 eggs or more per cc. He uses a system of marks to estimate the effects of treatment given for example two marks for a reduction of the egg count from the very heavy to the heavy infestation group. The efficiency index obtained by this system agreed with his clinical estimate of the efficiency of the treatment. The treatment given was usually 2 cc of carbon tetrachloride with 1 cc of oil of chenopodium made up with 15 gm of magnesium sulphate and water to 30 cc given in the morning after a glucose drink. This was a full dose for an adult male or well built woman (weighing 7-8 stones only in that area) smaller doses were given to others and to children. Latterly Wilkins has been giving 1 cc of the above mixture per 4 lb of body weight which is almost exactly 1 drachm per stone of body weight. The author discusses the sources of variations in the egg count which affect all methods of counting. He claims that his method helps the physician to decide the importance of the hookworms in the whole clinical picture. He thinks that persons with small counts can be left for later treatment saying that low counts found in the routine examination of school-children do not call for treatment in the absence of anaemia or other indication [HEILIG (see below) records evidence that in some cases the heart condition will not improve until the worms have been completely removed even when iron treatment has overcome the anaemia] Wilkins treated all moderate cases if the haemoglobin was less than 80 per cent Sahli. Hookworm sterilisation was not possible because children came from scattered villages. G. Lapeere

HEILIG (Robert) *The Pathological Heart Conditions in Hookworm Disease and their Causes*—*Indian Med Gaz* 1942 May Vol 77 No 5 pp 257-261 With 2 plates [19 refs.]

The author examined 65 cases of severe uncomplicated afebrile hookworm disease during anti-anaemic and anthelmintic treatment. The clinical picture of the heart condition is described in detail the author believing this detail to be necessary because the differential diagnosis from some valvular lesions is difficult. The differentiation between hookworm disease and decompensated mitral disease with failure of the right heart is especially important because the treatment and the fate of the patient depend upon it. Palpation

percussion and auscultation are often not enough. The deciding factors in heart failure due to mitral regurgitation namely dyspnoea, cyanosis usually with subicteric tinge, enlargement of the liver, congestion of the kidney with oliguria, albuminuria and urobilinuria, normal diastolic pressure and normal or increased erythrocyte counts and haemoglobin percentage are all absent from the picture of ankylostomiasis in which the blood shows microcytic hypochromic anaemia, erythrocyte counts as low as 0.7 million and a haemoglobin percentage of 10 per cent Sahli or less.

It is usually said that the damage done to the heart in ankylostomiasis is due to the anaemia. If this is true the pathological heart signs should disappear when the blood is sufficiently improved. The author's observations showed that this usually happens. Patients were given a uniform anti-anaemic treatment of Blaud's pills 90 grains a day when the haemoglobin reached 30 per cent they were given intramuscular injections of calcium gluconate (10 per cent 10 cc) every day with the iron as well until the haemoglobin reached 40 per cent. Then they were given 30-45 minims of carbon tetrachloride with 10-15 minims of oil of chenopodium divided into two or three doses and the hookworms passed during the following 12 hours were counted or if they were too numerous they were roughly estimated. The patients were not declared free of worms until 4-6 motions examined on alternate days were free from eggs. At weekly intervals the erythrocyte count, haemoglobin percentage, blood pressure and electrocardiograms were taken.

In 90 per cent of the 65 cases examined gradual and very considerable improvement of the heart strictly parallel with the increase of erythrocytes and haemoglobin followed before the anthelmintics were given. The slipping rapidly vanishing apex beat displaced outwards and downwards to the sixth intercostal space in most cases moved to its usual area and became normal. The systolic murmur in the pulmonary area became inaudible, the palpable closure of the pulmonary valve and the accentuation of the pulmonary second sound were no longer perceptible. Epigastric pulsation disappeared. From many cases the oedema was absorbed. The author found that the best and most harmless diuretic for the elimination of ascites was ammonium chloride grains 15 with calcium chloride grains 10. Case histories are given and some of the electrocardiograms are well reproduced.

Apart from these cases 6 patients remained all of them being women whose blood improved equally rapidly but the heart size in the six patients did not diminish. The electrocardiograms did not improve being sometimes worse with 50 per cent haemoglobin than with 15 per cent. The physical signs were almost uninfluenced. But soon after anthelmintic treatment all the pathological heart signs disappeared from these women also. Deworming therefore was necessary to improve the heart condition. In two of these women the first dose of the anthelmintic left about 100 worms behind and the electrocardiograms deteriorated further. Repetition of the anthelmintic was necessary to improve them although the haemoglobin had increased to 67 and 70 per cent respectively. One of these two was given large doses of vitamin B₁ to test the view that there is deficiency of this vitamin in ankylostomiasis but her electrocardiogram deteriorated still more after this treatment while deworming resulted in improvement.

Heilig discusses the causes of the changes in the heart and claims that his observation shows that degrees of hookworm infestation that cause severe anaemia are regularly accompanied by a serious diffuse myocardial lesion which causes general dilatation of the heart. The murmur produced are not haemic murmurs only but are also probably consequences of functional supravalvular pulmonary stenosis and a relative mitral insufficiency due to dilatation. In most cases this dilatation is probably due to anoxia resulting from severe deficiency of haemoglobin because it disappeared from 90 per cent of his patients without deworming when the anaemia was treated with iron. Because in the 15 women the heart condition improved only when deworming was complete although the haemoglobin percentage had risen from 10-15 per cent to 40-60 per cent Sahli the author thinks that two factors may be involved namely anaemia and a toxic agent derived from the hookworm. Most cases can compensate perhaps only temporarily against the action of the toxic agent when the anaemia is corrected but in a minority the toxic agent acts whatever the condition of the blood may be. Heilig could not decide whether this toxic agent is a toxin or an allergen. The eosinophilia often recorded suggests that it may be an allergen. In any event the best and most permanent results follow deworming after iron treatment and it is better to prolong the iron treatment after the deworming.

G. Lapeere

NICKEL (Hannah S.) Amebiasis and Hookworm Infection as found in Approximately 50 000 Fecal Examinations in Mississippi—*Amer J Trop Med* 1942 May Vol 22 No 3 pp 209-215 With 4 maps

Faecal specimen from every section of the State of Mississippi were examined during a period of 33 months. Only single specimens were examined in most of the cases. The zinc sulphate centrifugal floatation technique was used. The specimens were 24-72 hours old. One out of each 44 members of the population was examined a total of 49 170. *Entamoeba histolytica* was found in 4.4 per cent, other protozoa in 50.1 per cent (specimens not given), hookworm in 24.3 per cent (specimens not given) and other helminths in 2.9 per cent (specimens not given).

The low percentage of *Entamoeba histolytica* of the incidence of which in Mississippi no other records are available may be explained by the fact that only the cyst could be found by the technique used. Thirty-one specimens only were examined from most individuals and that the age of the specimen may have allowed cysts to disintegrate. Map shows the incidence in the counties of Mississippi, most of them are reasonably near 4.4 per cent. Hinds county showed only 2.4 per cent but although this county has the largest population in the State most of the specimens came from urban school-children and closely supervised persons handling food groups in which the incidence is accepted as being low. About 90 per cent of the specimens from Neshoba county were from Choctaw Indians and this county had a high incidence of 9.0 per cent. In the adjoining Newton County the specimens were almost entirely from youths of the National Youth Administration clientele and showed an incidence of 11 per cent. Practically 100 per cent of the populations of these two counties are rural with low incomes while Hinds County is over 60 per cent urban.

The estimated incidence of *E. histolytica* in the American population at large is 10 per cent. The probable incidence for Mississippi is 22 per cent if account is taken of the estimate of SAWITZ FAUST and THOMSON that the author's single technique for diagnosis of one stool specimen from each individual gives one chance in five of detecting *E. histolytica*.

The Rockefeller Sanitary Commission surveyed hookworm incidence in Mississippi State in 1910 and concentrated its efforts on those counties found to have an incidence of more than 15 per cent. For the 52 counties of that group their average percentage was 53.1 per cent; they used the simple smear method. Vanderbilt University School of Medicine and the Mississippi State Board of Health again surveyed the State in 1932-33 using the Stoll egg count method which was found better than the simple smear; they surveyed the same 52 counties and found a positive percentage of 19.6 out of 44,380 specimens. Nickel used only the zinc sulphate centrifugal floatation method and between July 1938 and April 1941 found 24.3 per cent positive out of 49,170 specimens taken from every section of the State. In the 52 counties studied by the two other surveys he found 31.2 per cent positive out of 36,248. Maps illustrate these three surveys. There was thus a remarkable decrease in the 52 selected counties from 53.1 to 19.6 per cent in the 20 years between the first two surveys and an increase from 19.6 to 31.2 per cent between the second and the third surveys. Nickel does not think her technique is better than that used by the other two surveys. No actual quantitative work was done but day to day observation led to the belief that the number of heavily infected individuals has dropped considerably.

The author's conclusion is that although the severity of hookworm infestations has apparently been reduced the number of persons infected has increased. Continued control is therefore necessary to counteract the potential danger of further dissemination.

G. Lapage

GALLIARD (Henri). Recherches sur le mécanisme de la transmission des filaires par les culicidés. [Researches on the Mechanism of the Transmission of Filariæ by Culicidæ].—*Ann. Parasit. Humaine et Comparée* 1941 Vol 18 Nos 4-6 pp 209-214. With 6 figs on 1 plate [17 refs].

The author studied the emergence of the larvae of *Buchereria bancrofti* from *Culex fatigans* and of *Dirofilaria immitis* from *Aedes aegypti* and *A. albopictus* confirming the work of MOCHIZUKI and others who found that these larvae emerged by the tip of the labellæ rather than by the membrane of Dutton between the labellæ. Good photographs illustrate his process. Some larvae may fail to penetrate the tip of one labella and may then turn round and return to the labium and emerge by the tip of the other labella. The larvae seem to require a stimulus to make them emerge and the chief stimulus under natural conditions seems to be the mechanical one of flexion of the proboscis at the moment of feeding. At a temperature of 30-35°C the larvae do not stay in the insect longer than 9-10 days after they have reached their infective stage, being eliminated often just as quickly when the insects are fed on sugar water, but if the temperature is lowered they may persist in the insect indefinitely, the activity of the larvae being much less at lower temperatures.

The proboscis of *Aedes aegypti* or *A. albopictus* may contain four or five larvae but Galliard found as many as 13 larvae in the proboscis of *A. aegypti* and distension of the labrum by several larvae may end in rupture of it. The c relatively small in cets when they are thus infested may fly heavily and maladroitly so that they may damage the proboscis when feeding or by flying against the sides of glass vessels in which they are confined. But it seems well proven that the infestation does not harm the in cets.

G Lapege

RUTIHALSEP (Armin) Beiträ zur Operation der Skrotumelephantiasis. Erfahrungen aus dem Spital von Dr. Albert Schweitzer in Lambaren Gabon (Afrique Equatoriale Française) [Contribution to the Operation for Scrotal Elephantiasis]—*Deut. Trip. Ztschr.* 1941 July 15 Vol 45 No 14 pp 436-440 With 7 figs [11 ref.]

The author describes the modifications of the operation for scrotal elephantiasis which improve the results obtained. These are the separation of the scrotal ture as far as possible from the anus by the substitution of a large posterior skin flap for the lateral ones which have been employed and the complete separation of the suture round the base of the penis from the scrotal ture by drawing the penis through an elliptical slit cut into the skin below the symphysis pubis.

The author did a large number of operations in Gabon and as not attended with the methods he learnt there which were similar to those of Thiené. The classical operations of Müller and Manon leave the penis without plastic skin covering this being left to nature. Although the method of taking skin from the mons veneris to cover the penis is better. The same takes skin from the side of the scrotum the tissue under the skin often dries and so that the skin over it is separated with the great stiffness and the blood supply is not satisfactory. The result is that arthritis is to be feared. The removal of all diseased skin is not possible in practice and the mutilation resulting from attempts to do it is not necessary. Skin for making a new scrotal sac must be freed from diseased subcutaneous tissue—a difficult task. Nagelbach came near to the requirement that the scrotal suture should be as far as possible from the anus. His suture had the form of a double cross and he put a glass or rubber drain in one or other of the hind ends of the suture. This is relatively near the anus and can be a source of infection of the wound. Another drawback of his method is that the sutures meet at three places these are weak points from which the whole wound may break open.

Rutihalsep first tried increasing the size of Nagelsbach's scrotal sac by a transverse incision in the anterior skin flap and ended by making instead a transverse incision across the scrotum or with a slight upward convexity from which another part forwards to the incision at the base of the penis. This gave the greatest possible separation of the scrotal suture from the anus but the suture at the base of the penis still met this transverse scrotal suture. To separate the penis as separated from its bed of diseased tissue by a superficial circular incision round the pocket of hypertrophied tissue in which it lies and the skin of the shaft of the penis and that of the prepuce was separated from its diseased subcutaneous tissue. Below the penis in the skin passing down from the symphysis pubis an elliptical slit was made the long axis of the

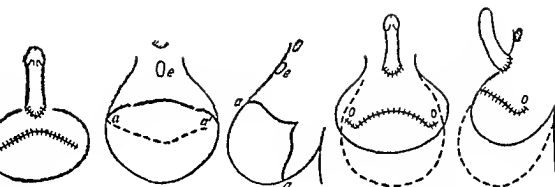


Fig 1

Fig 2

Fig 3

Reproduced from the *Deutsche Tropenmedizinische Zeitschrift*

ellipse being in the longitudinal axis of the body of the patient the subcutaneous tissue being separated here also. Then the penis was drawn through this slit together with its original skin. To prevent retraction of the body of the penis its skin was fixed by catgut to the corpora cavernosa. There was thus a circular suture round the root of the penis quite separated from the transverse one in the scrotum.

Herniae hydroceles and haematocoeles which may coexist with elephantiasis of the scrotum are treated with it. Castration was rarely undertaken when large haematocoeles were present. All the operations were done under local anaesthesia with the patient flat on the table and not in the lithotomy position.

Amputation of the scrotum was done by incising round it transversely after separation of the testes gubernacula and spermatic cords which were replaced in the scrotal wound after the amputation. The hinder border of the wound was then sutured to its upper border. Figs 2 and 3 illustrate this operation. The cosmetic results of it were good.

G Lape

YOUNG (W. A.) & GORDON (S.) Onchocerciasis in a West African Native on Service in East Africa—*East African Med J* 1942 July Vol 19 No 4 pp 131-134

The authors record a case of onchocerciasis in a West African native serving with the Forces in East Africa. So far as was known he had not served in any part of East Africa in which onchocerciasis has been reported but stated that he had previously lived all his life in the Northern Territory Province of the Gold Coast in a region as was pointed out by GIBBINS in a letter to the authors in which *Simulium damnosum* has recently been found by MORRIS. This region is near Tamale on the river Volta. The authors are inclined to think therefore that the patient brought his disease from the Gold Coast and that it apparently did not show itself for at least one year. The diagnosis was abundantly confirmed.

C W

ENZER (J.) A Preliminary Report on the Treatment of Onchocerciasis—*East African Med J* 1942 July Vol 19 No 4 pp 134-135

The author has treated a number of cases in 200 families removed from an area of Kenya infested with *Simulium* to a region free from

that fly. Of the drugs tried only eusflavine (Gonacrin) tryparsamide and Bayer 203 appeared to be effective and then only if combined with protein shock (T A B) therapy. Eusflavine was given in doses of 10 cc (but the strength and route presumably intravenous are not stated) tryparsamide in 2 gm doses and Bayer 203 in 1 gm dose (but the spacing and duration of the courses are not made clear nor is it explained exactly how protein shock was related to the giving of these drugs.]

Skin rips were taken twice after completion of treatment the first after one month the second three months later. Persons with negative results to both and disappearance of itching photophobia and lachrymation were regarded as apparently cured. No satisfactory history has yet been obtained of recovery or partial recovery of sight.

The author admits this to be a somewhat premature note written in the hope that others will repeat the work. C H

VARGAS (Luis) Algunas consideraciones sobre el desarrollo de *Onchocerca volutulus* en los Simuliidos. (Some Considerations on the Development of *Onchocerca volutulus* in Simuliidae).—*Periódico Salubridad y Enfermedades Tropicales* Mexico 1942 Mar Vol 3 No 1 pp 57-63 With 14 figs on 3 plates. English summary.

The salivary glands of *Simulium* occupy a twelfth part of the total volume of the thorax. The mouth parts occupy the volume of a cylinder 0.31 mm high and 0.04 mm in diameter. The maximum number of microfilariae which can be sucked up mechanically never reaches 10 but other factors come into play, namely haemorrhage, laceration of the tissues with consequent liberation of microfilariae, aspiration of tissue fluids and cells by the negative pharyngeal pressure and the marked chemotactic attraction of the microfilaria to the saliva of the insect. By the combination of all these factors Simuliidae can ingest more than 100 microfilariae each time they suck blood.

The author quotes HOFFMANN's earlier statements on *Onchocerca* in Mexico that in *Simulium callidum* and *S. ochraceum* the microfilariae pass very quickly through the walls of the stomach to develop between the thoracic muscle into the mature form, that he (Hoffmann) never saw microfilariae in the stomach 24 hours after feeding, that the microfilariae reached the mature form in *Eusimulium n. s. n.* (= *callidum*) because he found the typical form resembling the mature form 18 hours after the entry of the microfilariae into the black fly and that he distinguished four phases in the insect. These phases are: (1) The entry of the microfilariae into the stomach and then into the thoracic muscles where they can be found after 20 hours. They do not then differ in form or size from microfilariae which can be found in the skin. There is not yet any space round them. They which cannot leave the stomach die and are digested. They have some difficulty in passing through the stomach walls. (2) A phase of hortening. (3) The so-called mature form. (4) The worm or maggot-like phase.

Vargas thinks that Hoffmann's description of the event of the first phase is too schematic. The anatomy of the digestive tube should be taken into consideration. After a description of this he concluded that microfilariae found in the thoracic muscles did not come from the midgut because they could not pass through its wall. Those left in the stomach are as Hoffmann stated probably digested. All the

microfilariae that reach the thoracic muscles most probably come from the esophageal diverticulum the walls of which are very thin. It can even be supposed that this diverticulum may be so much distended that it bursts and sets microfilariae free.

In an earlier paper Vargas showed that the microfilariae develop especially in the dorso ventral muscles. He describes his method of clearing whole black flies and examining them from both sides on the same slide by turning the slide over. This method does not reveal all the microfilariae in the fly but only those in the thoracic muscles where they develop most often but the method provides a basis for comparison of the degree of infestation of different species of black flies. Examination in this way of about 75 specimens of *S. callidum* caught in September in the region of Chiapas from which Hoffmann also obtained material showed that 100 per cent of the flies were infested.

Pieces of skin removed from infested patients were put in Petri dishes and moistened with human serum mixed with Locke's solution or with Locke's solution alone the dishes being kept at laboratory temperature (22-25°C) in a moist chamber. The abundant and very active microfilariae found in the piece of skin at first showed no internal structure but after 24 hours they showed granules regularly arranged from head to tail and they were still active the anal excretory pore was by that time visible. After 48 hours their movements were slower but none had died. After 72 hours 60 per cent were dead and after 96 hours all were dead. In *Eusimulium mooseri* (= *callidum*) Vargas observed the same form 68 hours after its infective feed. Measurements of microfilariae taken from the skin of patients by biopsy indicated an average length of 270 microns which like the facts just stated shows that a stage of shortening does not occur. Vargas thinks that we still need a detailed study of the complete cycle of developmental stages in the black fly.

G. Lapage

CULBERTSON (James T) Active Immunity in Mice against *Trichinella spiralis* — *Jl Parasitology* 1942 June Vol 28 No 3 pp 197-202

Various earlier workers have shown that immunity against *Trichinella spiralis* is acquired after recovery from a previous infestation and most workers agree that this immunity is directed against the intestinal phase of the parasite. Its mechanism is still obscure. Culbertson studied acquired immunity in the albino mouse which has been little used for such work. Larvae were obtained from infested rats by artificial digestion of their eviscerated and ground up carcasses. The larvae were suspended in bacteriological broth to which 20 per cent of gelatin had been added and in this they survived for several days. It was also easier to administer them in this because they stayed in suspension in it for some minutes. They were given to the mice by injection through a blunted 22 gauge hypodermic needle pushed into the retropharynx and were usually swallowed without difficulty. The mice were killed 4-7 days after the larvae had been given and their intestines were repeatedly examined for adult *Trichinella*. Other mice were given one or more preliminary doses of larvae and after an interval a test dose which was also given to controls. At autopsy 5-7 days later or in some instances 27-35 days

later the number of larvae recovered from the muscles was counted. Two groups of 5 and 6 mice were given larvae to determine whether prior infestation prevented subsequently administered larvae from developing to the adult stage. Group A of five mice received 100 larvae 22 days before a test dose of 175 larvae. Group B of 6 mice received 100 larvae 60 days before a test dose of 250 larvae. Group A with its 7 controls given the test dose only were killed 5 days after the test dose. Group B with its five controls were killed seven days after the test dose. From none of the previously infested mice were so many adult worms recovered from the intestine. The number of adults recovered from group A represented an average of 8.6 per cent of the larvae fed while the number recovered from the control of this group represented an average of 55.5 per cent of the larvae fed. For Group B the corresponding figures were 1.4 and 50.8 per cent respectively.

Seventeen mice were given four doses of 250 larvae at each dose 60, 36, 22 and 10 days before a test dose of 1,000 larvae and nine controls were given the test dose only. When they were all killed 27-35 days later the muscles of the controls contained an average of 154,626 larvae while those of the previously infested mice contained an average of 60,087 larvae. It is to be noted that the controls received only about half as many larvae and suffered about two and a half times as much. By the third day after the test dose many of the previously infested mice showed an exudate from the anus and when this persisted for several days they died. Seventeen died from the 9th to the 23rd day after the test dose although all the controls survived and none showed the anal exudate but when they were autopsied during the fourth week after the test dose the controls were rapidly losing weight, some were moribund and it was unlikely that they would have survived. The survivor of the previously infested one on the other hand put on weight and seemed not to suffer at all.

McCoy showed that rat can be protected by vaccination with antigen although the attempt of BACHMAN and RODRIGUEZ MOLINA to protect hog in this way have failed. Culbertson vaccinated mice by injecting 0.1 cc of a 1 per cent suspension of *Trichinella spiralis* powder in carbolized salt solution per 10 gm mouse weight giving eight injections on alternate days. Five days after the last injection 11 mice and 10 controls were given 250 larvae and all were examined four days later and their intestines searched. In the vaccinated mice only about half as many adult worms were found representing 28.4 per cent of the larvae fed while the control had adults representing 52.8 per cent of the larvae fed. Two of the vaccinated mice evidently failed to respond but the others had a significant immunity. Doses of 250 larvae were given to nine vaccinated mice and seven controls on the fifth day after the last injection of *Trichinella* substance. At autopsy 28-29 days later 20,248 larvae were recovered from the muscles of the vaccinated mice and 55,139 from those of the control. Two of the vaccinated mice yielded almost as many as the control did.

Culbertson concludes that both previous infestation and vaccination confer immunity which is effective against the intestinal phase. He and Kaplan in 1938 had reported that rabbit antiserum rich in the specific antibody gave mice a partial immunity. Prior infestation gives a higher immunity than either vaccination or passive immunization. The death of some of the mice immunized by prior infestation is explained as being due to hypersensitivity to the *Trichinella* substance.

BERCOVITZ in a personal communication to the author said that similar acute early symptoms suggesting hypersensitivity may occur in human beings when they are reinfested

G Lapage

CULBERTSON (James T) *Passive Transfer of Immunity to Trichinella spiralis in the Rat*—*Jl Parasitology* 1942 June Vol 28 No 3 pp 203-206

For this work similar methods were used for the recovery of worms and larvae. Four adult normal rats which had been given by the mouth 2,000 isolated larvae were bled one month after the larvae were given and the sera were pooled for use. Normal serum was obtained from several normal rats. Five tenths of a cc of these sera were given intraperitoneally two days before and on the day after infestation with 250 larvae of *Trichinella*, this dose of serum being the equivalent of 3 cc per 100 gm of rat weight.

The number of worms recovered from the intestines represented in the rats receiving immune serum 4.5 per cent of the larvae given in the rats receiving normal serum 24.0 per cent and in the rats receiving no serum 24.7 per cent. The average number of larvae recovered from the muscles of the rats given immune serum was 12.089 the average number recovered from the rats given normal serum was 47.613 and the average number from the rats receiving no serum was 56.564. These results indicate that a passive immunity can be transmitted. By it the development of the worm in the intestine is checked as it is by active immunity but the check is not so effective but the comparatively small amount of immune serum used could hardly be expected to equal the effect of the total blood of an actively immunized animal. There is no reason to suspect a qualitative difference. The immunity is evidently conferred by some humoral substance in the blood and Culbertson thinks that the same substance acts in active immunity. The rapidity of the response has precedents in the Arthus reaction in the skin of rabbits which occurs 2-3 hours after injection of the specific antigen even if the animal has been passively sensitized in anaphylactic shock which may occur a few minutes after the homologous antigen is injected into a well sensitized guinea pig whether it is actively or passively sensitized and in allergic reaction in the skin of man which reach their peak within a few minutes after the tissue has had contact with the specific antigen. The rapidity of the reaction is thus no argument against the suggestion that a humoral substance in the blood is concerned and conventional mechanisms can not be excluded.

G Lapage

DEFICIENCY DISEASES

FERRO LUZZI (Giovanni) *Primi studi su una particolare forma di pseudo-tube tropicale* [A Peculiar Form of Tropical Pseudo tabes]—*Boll d Soc Italiana di Med e Igiene Trop* (Sez Eritrea) Asmara 1942 Vol 1 No 2 pp 5-14 English summary

Professor Ferro Luzzi describes from the clinical point of view only a peculiar condition which he denominates a polyncuritis of a pseudo tubercetic type. He places it among the group of diseases caused by deficiency of vitamin B₁ although the diet of the patients has not

been deficient in the vitamin nor is the disease improved by giving the vitamin. It may be due to defective vitamin B₁ metabolism rather than to lack. Of 32 cases of polyneuritis of various type seen by him in three years 13 have been of this form. The condition is therefore not rare. It attacks young male European adults.

The first symptoms noticed by the patient are paraesthesia and weakness of the legs, neuralgia, difficulty in walking due to incoordination of movement. At first these are slight and transient, later are more marked. Groups of muscles atrophy and the step-like gait develops and walking becomes impossible. Occasionally the legs and less often the trunk and face become oedematous. Præcordial pain and dyspnoea are common. The cardiac area is enlarged and the heart sound embryonic, there is moderate cyanosis. The liver is enlarged, probably owing to toxic. Romberg sign is present but the Argyll Robertson pupil is not observed. The Wassermann reaction is negative both with the serum and with the spinal fluid. Knee-jerks are lost. Tactile heat and pain senses are dulled in the affected limbs. Certain muscle groups show the reaction of degeneration. If the cardiac changes progress death may result. In any case the course is very prolonged, perhaps for years and recovery is never complete. By way of treatment the author gives vitamin B and employs strychnine, electricity, diathermy and massage.

The condition is distinguished from beriberi by the facts above stated—that the diet is not deficient in vitamin and that the giving of the vitamin does not benefit, but hemolysis is a part of the treatment. From locomotor ataxia by the absence of ocular symptoms, the negative Wassermann reaction and the cardiac symptom from spinal growth by the course of the disease and the presence of cardiac symptom. [The condition still probably remains obscure till an opportunity occurs for a complete post mortem examination. One of the author's patients died but not in hospital and autopsy was not performed.]

H Harold Scott

CAREBOROUGH (Harold) Circumcorneal Injection as a Sign of Riboflavin Deficiency in Man with an Account of Three Cases of Ariboflavinosis—*Brit Med J* 1942 Nov 21 pp 601-604 With 1 chart 10 ref

Circumcorneal injection has been described as one of the ocular abnormalities which may be present in riboflavin deficiency in man. In an effort to evaluate the specificity of this sign the incidence was noted in a series of 204 outpatients free from ocular infection. Circumcorneal injection was found in 70 of these patients 43 instances occurring in the group of 63 persons over 50 years of age.

Because it seemed unlikely that such a large proportion of patients suffered from riboflavin deficiency therapeutic tests were carried out on small selected groups—eleven persons with circumcorneal injection but no other signs suggestive of a riboflavin deficiency. They received no improvement after oral and/or intramuscular administration of 3 to 12 milligrammes of riboflavin daily over periods of 14 to 27 days. A second group of eight patients with clinical evidence of vitamin deficiencies was composed of six patients with curvone with pellagra and one with hypochromic and microcytic anaemia. All these had circumcorneal injection and had been treated with ascorbic acid, the patient with anaemia took ferrous sulphate and the one with pellagra was treated

with nicotinic acid. Riboflavin was administered by mouth in doses of 6 to 12 milligrammes for 14 to 28 days or by intramuscular injection of 5 or 10 milligrammes daily for 2 to 10 days. Three patients with scurvy showed no improvement of circumcorneal congestion two were improved and one cured. The ocular signs of the patients with anemia and pellagra were cured. Three instances of typical riboflavinosis were observed during the same period these responded to adequate therapy with riboflavin. It was notable that relapse occurred when riboflavin was withdrawn from the patients who had secured improvement under treatment. [It is obvious that circumcorneal injection may be caused by many conditions other than riboflavin deficiency and that solitary pathognomonic signs of vitaminosis probably do not exist.] P Sydenstricker

DÍAZ RUBIO (M) Estudios sobre la enfermedad de Casal I Comunicación—El comportamiento de la secreción gástrica en la pelagra y consideraciones sobre el mismo [Studies in Pellagra I The Gastric Secretion]—*Rev Clin Española* 1941 Apr 1 Vol 2 No 4 pp 323-334 [57 refs] French summary

The author has made a detailed investigation of the gastric secretion of 342 pellagrins. First as regards the amount secreted by the fasting stomach this was practically normal in 178 (52 per cent) in 116 (33.9 per cent) it was reduced in 48 (14 per cent) it was increased (above 40 cc) but in one only was there marked increase to over 100 cc.

Next the total acidity in 35 per cent only was it normal diminished in 95.6 per cent. Free HCl in the fasting state after stimulation by alcohol or by histamine was present in normal amount in 3 patients (0.9 per cent) diminished in 10 (2.9) in one increased in the vast majority 328 or 96 per cent absent. The method used in 265 was Ehrmann's alcoholic solution in 52 injection of 0.5 mgm histamine in 25 both these methods. Extraction of the gastric contents was carried out at intervals of 30 45 and 60 minutes and in some cases at 15 and 80 minutes also.

The author discusses these changes and the part they play in pellagra whether there is parallelism or any demonstrable relation between the secretory changes and other symptoms of the disease and concludes that achylia is a characteristic and very constant symptom that there is parallelism between the gastric changes and the clinical condition and that the administration of nicotinic acid relieves the achylia. [The contribution is embellished by many quotations and references to well known names in the literature of pellagra.]

H Harold Scott

DÍAZ RUBIO (M) & LARA ROLDÁN (L) Estudios sobre la enfermedad de Casal II Comunicación El comportamiento radiológico del estómago en la pelagra [Studies in Pellagra II Radiological Examination of the Stomach]—*Rev Clin Española* 1942 Mar 30 Vol 4 No 6 pp 408-413 French summary

During the period 1937-39 the authors studied this aspect of the question in 255 pellagrins in Madrid. They noted the tone of the

stomach wall the peristaltic movements whether normal diminished or increased and the appearance of the mucosa. The tone was lowered in 170 cases (67.2 per cent) dilatation was seen and in 161 (63.1 per cent) peristalsis was diminished and evacuation delayed in some to high degree. Marked aerogastria was observed in certain of the patients and the mucosa was covered with thick viscid secretion. In 59 patients examination was repeated at different times or in different clinical states and the close inter-dependence or correlation between the clinical state and the gastric changes was noted. [The value of the statements is discounted somewhat by the fact that in 71 (27.7 per cent) the tone was normal in 80 (31.6 per cent) peristalsis was normal and in 79 (30.9 per cent) nothing abnormal was observed in the mucosa.]

H Harold Scott

DÍAZ RUBIO (M) Estudios sobre la enfermedad de Casal III
Comunicación Constitución y pelagra [Studies in Pellagra
III Pellagra and the Bodily Constitution]—*Rev Clin Espanola*
194 Apr 30 Vol 5 No 2 pp 101-105 [4 ref] French
summary

Although this contribution is said to be based upon 578 pellagrins under the author's observation in the years 1937-39 the paper as a whole is very agreeable. No figures are mentioned and general statements are made as to the obscure effects of endocrines in pellagra. The fact that the disease occurs in certain families or more in one family than another forces the author to admit the existence of a predisposition or resistance to pellagra. Other points which he refers to but does not discuss are the importance of age of pregnancy of the characteristic instances of spontaneous cure or in other of a course ending fatally in a short time. These latter are ascribed to the subjects being a thymic and hypoplastic condition itself being the result of thyroid pituitary adrenal or other endocrine disturbance.

H Harold Scott

KHORANA (M L) SARIA (M L) & GILL (K V) Investigations on the Food Value of Fish and Other Marine Products Part I The Antipellagra Vitamin (Nicotinic Acid)—*Indian J Med Res*
1942 Apr Vol 30 No 2 pp 315-318

No systematic inquiry had previously been made into the food value of fish from the Waltair coastal waters. Accordingly the nicotine acid content of the fresh muscle tissue of sea shark, Jet fish, horse mackerel, ribbon fish, cat fish, goldvindalu, barai, matta, hula, pomfrets, silver bellies, whitebait, mullets, sabre fish, pollona and nesudumullu, prawn, crab and cuttle fish and of the fresh liver of sea shark were determined by a chemical method. The content of the majority of these ranged from 2.4 mgm in 100 gm of muscle a figure which compares favourably with that of the much more expensive mammalian muscle tissue. Hilsa and prawns were the two richest sources containing 4.7 and 4.8 mgm respectively.

H N Green

VENOMS AND ANTIVENENES

STANLEY JONES (D) & HARPIS (Charles E S) A Case of Adder Bite
—*Brit Med J* 1942 Oct 3 p 395

A woman of 63 was bitten on the hand in England by a snake which was not identified about 20 minutes later the wrist having already been tightly bound the punctures were incised and a few ounces of blood were allowed to escape The binding at the wrist was then removed Within a few hours there was marked toxic cellulitis of the whole arm with oedema which later spread to the capular region and the scalp the path of the lymphatics was marked by wide areas of capillary haemorrhage Treatment was palliative in the absence of antivenene and recovery was slow but was almost complete in 4 weeks Constitutional reaction was slight throughout It is pointed out that the result of bite by a member of the family Viperidae may be interstitial fibrosis of the areas affected by the haemorrhage and that if this occurs in the liver spleen kidneys or heart the outcome may be chronic invalidism C W

ASSRATIAN (S N) Pharmacological Properties of the Venom of *Vipera ursini renardi*—*Travaux Acad Milit Méd Armée Rouge U R S S* Moscow 1941 Vol 25 [In Russian pp 404-415 With 8 figs (17 refs) English summary pp 415-416]

PERGOLA (Alfredo) Affezioni oculari da veleno di *Naja nigricollis* (Osservazioni cliniche) [Eye Lesions due to the Venom of *Naja nigricollis*—*Boll d Soc Italiana di Med e Igiene Trop* (Sez Eritrea) Asmara 1942 Vol 1 No 1 pp 80-91 English summary

There are several species of spitting snakes in Africa but only one met with in Somaliland and Eritrea *N. nigricollis* whose bite may be fatal This snake when disturbed aims its venom at the face of the intruder Three cases under the author's observation are described The history is similar in all The patient saw a snake about a yard in length pass in front of him and almost immediately felt an intense burning pain in the eyes which for a time blinded him When coming under observation it might be some hours later there was still marked blepharospasm with a little oedema of the lids on relief of the spasm the conjunctiva showed marked congestion and in parts inflammation as if acid or quicklime had been squirted in the eye but further examination did not reveal any actual damage though others have recorded subsequent ulceration of the cornea Antivenene can be given but a rule the condition is too acute for anything but local treatment—washing out with 1 5 000 potassium permanganate instilling neutral atropine sulphate drops Later 5 per cent argyrol is of service Cure is usually complete in 5-8 days There was no sequela in any of the author's cases

H Harold Scott

IVYNGER (N K) DUTT (N K) & MUKERJI (B) In vivo Action of Some Substances on the Proteolytic System in Blood—*Indian Med Gaz* 1942 July Vol 77 No 7 pp 409-412 [11 refs]

The action of cobra venom on the tryptic activity of plasma has been studied It has been found that up to a dose of 0.12 mg/kg

there is a remarkable increase in the tryp in content of plasma and it begins to go down if the dose is increased beyond this limit. The various possibilities regarding this increase have been investigated and it is suggested that the venom may be released into the blood stream trypan from the tissues. It is interesting to recall that Iyengar *et al* (1941) have reported that plasma trypsin is reduced considerably in cases of malignant growth and that Chopra and Cho han (1933) have recommended the administration of cobra venom solutions in the therapy of cancer. The finding in the present investigation that the plasma trypsin increased by the administration of the cobra venom may therefore be useful partially to explain the rationale of the treatment of cancer by cobra venom. The decrease in plasma trypsin brought about by larger doses of the venom is due to the trypsin inhibitor reported to be present in the venom. This inhibitor effectively comes into action only when the venom is administered in larger doses, not encountered in clinical practice. In this respect naphthoquinone does not exert any action on the plasma trypsin but appears to inhibit the catheptic activity of serum. It is suggested that the action of the drug may serve to explain the mechanism of the action of vitamin K in synthesizing prothrombin.

DE MAGALHAES (Oct. 30) Escorpionismo (Scorpion Sting) - *Brasil Medico* 1941 May 16 Vol 56 No 20 pp 23-253

Recalling the experiment in which three camandons (Brazilian house rat) were stung one after the other by the same scorpion with the result that the first died the second was severely affected and the third only slightly affected the author recounts the case of a girl who was stung on the arm. The same scorpion showed the typical attendant horrors of the girl. The first patient showed the typical picture of scorpion sting with sweating, chill, vomiting, cardiac arrhythmia and dyspnoea from which he recovered after receiving serum. The second patient suffered here local pain which as related by no cocaine and slight cramp. Evidently the venom of a scorpion which has recently attacked an animal is no more as that of the first attack and this may be the explanation of the mildness of the symptoms sometimes recorded. C II

MOHAMMED (Ahmed Hassan) Preparation of Antiscorpion Serum Use of Atropine and Ergotoxine - *Lancet* 1940 Sept 26 pp 364-365

The author has previously shown that scorpion toxin directly stimulates the nerve ending of the autonomic nervous system without effect on—i.e. a vaso-constrictor to either innervated blood vessels or to the cholinergic sympathetic nerve supply has been cut. He has shown moreover that if the sympathetic and parasympathetic nervous systems are first paralysed with atropine and ergotoxine (neither alone is effective) or with ergotamine tartrate lethal doses of scorpion toxin can be injected without harm. This procedure however does not interfere with the development of immunity and by the use of these drugs scorpion toxin (instead of formal toxin) may be used from the outset for the preparation of immune serum. He quotes

experiments in dogs rabbits and goats to show that efficient sera may be prepared in this way after the first 12 injections or so it was not necessary to continue the use of the drugs Doses of the drugs and of the amounts of toxin used are given in detail C II

GAJARDO TONAR (Roberto) El latrodectismo o envenenamiento producido por la picadura de la Arana del Trigo (*Latrodectus mactans*) [Latrodectism Polsoning by the Bite of the Wheat field Spider *Latrodectus mactans*].—*Prensa Med Valparaiso* 1941 July-Aug-Sept Vol 6 No 28 pp 3-18 24 English summary With 5 figs & 3 charts. [35 refs]

This is an excellent and detailed account of the Black Widow spider its poison and toxic effects and of some experimental work carried out by the author. The genus *Latrodectus* has several synonyms malmignati in Spain and Italy karakurt in Russia menardi in Madagascar kulipo in New Zealand mico in Bolivia lucacha in Peru. The spider and its poison apparatus are described. The quantity of poison varies with age and length of time since previous discharge but a full gland contains about 0.5 mgm. It is clear and limp when fresh sticky and yellow when dried. It is said to be alkaline when warm acid when cold and is more potent when alkaline [hence changes of climate and temperature may modify its toxicity]. The spider seems never to attack man unless it is irritated handled or injured.

This species (*mactans*) is found from California to Patagonia and throughout Chile. It abounds in summer and particularly in dry seasons hiding under stones clods of earth and in crevices in the soil. The author's description of symptoms is based on 23 cases seen between November and March. The sequence in successive months being 1 2 12 3 and 5. Locally there is usually little to be seen merely a small red spot with the marks of penetration of the chelicerae.

The symptoms will naturally vary according to the amount of poison injected and the susceptibility of the patient but the usual course is as follows. A sharp prick is felt and the spider is usually found hidden in the clothes. Then there is a brief period during which nothing is observed except some tremor and anxiety. In ten minutes or so pain returns and steadily increases. The muscles show clonic and tonic contractions and there are tremors and convulsive movements. These spread over most of the body. The legs arms abdominal and thoracic muscles are involved with rigidity and the patient feels as if death were imminent. Sweating lachrymation and salivation are marked. The skin is acutely sensitive the reflexes exaggerated respirations rapid and shallow heart beat quickened but later there is bradycardia. Arterial pressure is incredibly high 350 mm in a man of 60 and 242 in a lad of 19 years later returning to normal there is albuminuria and at times priapism enuresis and emissions. The symptoms abate after a few hours but with intermittent exacerbations less and less severe till convalescence. During the acute stage the patient cannot walk there is vomiting in more than half the cases temperature is variable it may be raised remain normal or become subnormal. Headache is common with vertigo. An average case ends in recovery in a week or ten days. None of the author's patients died but fatalities have been recorded. Treatment is symptomatic.

Theoretically serum should do good but as a rule the symptoms come on too rapidly and the small amount of toxin obtainable makes the preparation of antivenene difficult.

By his experimental work the author has shown that birds, reptiles and batrachia are much more resistant than are mammals. In susceptible animals the symptoms produced are the same as or analogous with those in man but death results in guinea-pigs for example in 5-12 hours. (The author has noticed in the field of Cusablanca at the end of spring and during the summer that there is a heavy mortality among calves with symptoms like those seen in experimental work with sheep and other animals and he believes that bites by *Latrodectus* are the cause.) Autopsy on experimental animals reveal nothing very distinctive. The notable findings are pulmonary oedema, abundant bronchial secretion at times blood stained, plural effusions, congestion of liver, spleen and kidneys and perhaps infarcts in the last peritoneal exudation and meningeal congestion. Animals which recover retain some degree of immunity for three months. [For a detailed and graphic account of the symptoms in man see also this *Bulletin* 1936 Vol. 33 p. 401.] H. Harold Sco

MISCELLANEOUS

SONNENSCHN (Curt) Gesundheit dien t in Sudwestafrika in Nachkriegszeit (Health Services in South West Africa since 1918) — *Deut Trop Ztschr* 1941 Apr 15 Vol 45 No 8 pp 225-235 With 6 figs

The author gives a brief list of hospitals existing in South West Africa and follows this with remarks on the common diseases of the country. Typhoid fever is apparently less frequent than formerly and bacillary dysentery is said to be sporadic but amoebic dysentery is endemic especially in the north. Tuberculosis is important and has increased markedly in the natives during famine years especially in mine workers and town dwellers the type is in general more acute than in Europe. The commonest cause of death among labourers is influenza.

Cerebrospinal meningitis is prevalent among mine workers who are brought together in compounds and who therefore live in close contact. Diphtheria is rare but scarlet fever is reported to be fairly common in European children. Brucellosis is well known and is noted especially in the country of the Ovambo.

Of the venereal diseases syphilis is the most important again especially in Ambo districts gonorrhoea is not uncommon. Yaws is rare in the farm country but is frequently seen in Amboland. Leprosy is commoner in the north and in western Caprivi than elsewhere. Anthrax is especially seen in Oamboland and Amboland. Typhus has been reported from Keetmanshoop and Windhoek. Smallpox occurs sporadically but there was an epidemic in Caprivi in 1935. Plague was introduced into South West Africa after the war of 1914-18 in 1932 there was a severe outbreak in Amboland.

Malaria is important and benign tertian is the common form though subtertian occurs in places. Malaria becomes epidemic towards the

end of the rainy season it is more intense in the north [no information as to the vectors is given] Of helminthic diseases ankylostomiasis is the most important Scurvy has been seen in mine workers and in Ovamboland in years of drought pellagra has been found near the border of Angola C II

MELENEY (Henry E) The Problem of Certain Tropical Diseases In the War—*New England J of Med* 1942 July 30 Vol 227 No 5 pp 159-162

BLACKLOCK (D B) An Epitome of the Prevention of Certain Diseases and Infections occurring in Man—*Jl Roy Nav Med Serv* 1942 July Vol 28 No 3 pp 262-284

BLANC (Georges) & BALTAZARD (Marcel) Transmission de l'infection à bacille de Whitmore par insectes piqueurs I Maladie expérimentale du cobaye [Transmission of the Bacillus of Whitmore by Biting Insects]—*Ann Inst Pasteur* 1942 Apr-May-June Vol 68 No 4-5-6 pp 281-293 With 8 figs

From a patient suffering from melioidosis contracted in Indo China the bacillus of Whitmore was isolated the infection was found to be readily transmissible to rodents by the rat flea and also by the mosquito *Aedes aegypti* [see also this *Bulletin* 1942 Vol 39 p 576] Several hundred fleas infected by biting an infected guineapig were placed in a Borrel tube capped with fine silk gauze the tube was applied twice daily to the epilated ventral skin of guineapigs till the inguinal glands of the animals became enlarged to the size of a grain of wheat Usually this happened after three to four days In other cases the guineapigs were put into screened cages containing some thousands of infected fleas

Twenty one guineapigs were infected by rat fleas and two by *Aedes aegypti* All the animals died of melioidosis usually in four to twelve days in one case death was delayed till 28 days after infection Blood cultures taken at the onset of the fever were negative but fleas which were fed on the animals at this period became infected After death the blood and spleen gave positive cultures except in the case of the guineapig which survived for 28 days The naked eye and microscopical changes found after death are described The glands associated with the region of the infecting bites were greatly enlarged and purulent the spleen was enlarged and often was riddled with miliary abscesses the liver was enlarged and fatty In more than half of the cases there were abscesses in the lungs these usually resembled the nodules found in plague infected animals John W D Megaw

SPENCER (Gerald A) Anihum associated with Hyperkeratosis Palmaris et Plantaris—*Arch Dermat & Syph* 1942 Mar Vol 45 No 3 pp 574-577 With 2 figs

The patient was a negro in New York who had had hyperkeratosis of the palms and soles for many years Bands around the small toes had appeared during the preceding 10 years and the condition of anihum with rarefaction of bone had developed slowly The Wassermann reaction was positive there was no fungus infection locally It is probable that the anihum was a sequel to the underlying skin condition C II

GILMAN (Robert L.) A Review of Fish Poisoning in the Puerto Rico-Virgin Islands Area. A Report of Ten Cases occurring on Culebra Island.—*U. S. Nav. Med. Bull.* 1942 Jan Vol 40 No 1 pp 19-27 With 2 plates

In May 1941 the author examined 12 out of ten persons who became ill after eating a male Barracuda (*Sphyrænaidae barracuda*) caught the day before. None of those who ate the fish escaped. Three cat and a dog later had some of it. All the animals fell ill and all the cat died. The symptoms in the human cases were somewhat extreme but all the patient recovered. Recovery might not be complete for a long a three month though usually in a month or so. The chief complaints were nausea vomiting a metallic taste colic, diarrhoea weakness and numbness of the leg. Peculiar symptoms were cranial paraesthesia and visual disturbances. The paraesthesias were mainly of the tongue and burning sensations in lips mouth and tongue and itching and cold fluid felt as hot. Symptoms might come on in a few minutes after eating the fish but in one patient there was a latent interval of 24 hours.

The author discusses the various theories of causation which are to be found in the literature but is unable to contribute anything fresh. The toxin occurs in the larvae fish at parturition time and is not removed by cooking or salting. Outbreaks such as this are known to occur in Cuba Porto Rico the Virgin Islands Jamaica Turk Island and Barbados usually in late summer August-October or in the month November to the end of January. As the cases recorded here occurred in May they were unusual. Treatment is purely symptomatic—rest in bed administration of a purgative and the use of mild sedatives.

The poison of a neurotoxin as well as an intestinal irritant calls for further investigation. The author gives a useful list (appended here) of the peculiar fish regarded as poisonous in the Porto Rico-Virgin Islands region.

I CARANGIDAE (Jack)

Antherjack or madreporal
Yellow jack
Shrimper or cavalier
Horse-eyed Jack jurí

Seriola falcata
Caranx bartholomaei
Caranx ruber
Caranx latipes

II SCOMBRIDAE (Mackerel)

Black horse mackerel (cera) or pintado

Scomberomorus caillat
Scomberomorus vaigiensis

III SPHYRAENIDAE

Barracuda (large variety)

Sphyrænaidae barracuda

IV LUTIANIDAE

Red Snapper

Lutjanus aya
H. Harold Scott

- 1 JIMÉNEZ DIAZ (C) RODA (E) ORTIZ DE LANDÁZURI (E) MARINA (C) & LORENTE (L) Investigaciones sobre el latirismo II Comunicación El cuadro clínico [Studies in Lathyrism II Clinical Picture]—*Rev Clin Española* 1942 May 15 Vol 5 No 3 pp 168-177 With 10 figs [13 refs] French summary
- 11 ——— & VIVANCO (F) Estudios sobre el latirismo III Comunicación Intentos de reproducir en los animales el latirismo por una dieta de harina de almortas (*Lathyrus sativus*) [Studies in Lathyrism III Attempts to reproduce the Symptoms of (so called) Lathyrism by feeding Animals on the Flour of *L. sativus*]—*Ibid* May 30 No 4 pp 234-241 With 7 figs French summary

[These articles are II and III of a series No I has not been received at the Bureau and there is no indication in these as to the aspect dealt with in the first communication]

i In the clinical account 23 cases are considered all but one being males their ages ranged from that of a child of 6 to an adult of 55 years ten of them between 18 and 40 years The onset may be very acute even fulminating thus one patient had painful cramps in the night and the following morning was unable to walk More usually there are prodromata for some days—chilly sensations debility fatigue muscle pains tingling formication and increasing impairment of movement The gait is peculiar spastic legs rigid knees slightly flexed later stiff and movement is aided by the use of one or two sticks or even crutches Attempts at walking are preceded by movements as if the feet were glued to the floor There is no tremor the arms and cranial nerves are not affected paraesthesias may be present for the first 2-3 months of illness and occasionally loss of control of sphincters In the early days pain may be severe in the calves lumbar region and groins and less often the neck The deep reflexes in the leg are exaggerated there may be clonus The arms are not involved and the skin reflexes are normal No affection of sensation could be detected The attitude when standing is that of muscular hypertonus in short the signs are those of involvement of the pyramidal tracts the general state of nutrition may be good Treatment by vitamins is ineffectual strychnine is disappointing in a fair proportion of cases quinine grains 6 daily seemed to benefit while warm baths and massage relieved the spasticity though usually only temporarily

ii The authors have carried out carefully a long series of experiments feeding animals for as long as 9-10 months on the flour of the vetch *Lathyrus sativus* They used 195 rats 6 rabbits 6 dogs and a monkey Details are given of each group but the results may be summed up by saying that in the rats growth was slow but in none of the animals were any symptoms produced which could be said to resemble those of so called lathyrism Post mortem changes were practically nil except that in those dogs which had suffered from diarrhoea meteorism and digestive disturbance there might be haemorrhages in the viscera and serous exudates

H Harold Scott

CHOPRA (R N) CHOPRA (Gurbaksh Singh) & CHOPRA (I C) Minor Drug Habits of India—*Indian Med Gaz* 1942 Jan & Feb Vol 77 Nos 1 & 2 pp 34-41 107-114 [13 refs]

These are two interesting papers dealing with what the authors term dopcs They begin by enumerating the points of difference

between dopes and the recognized addiction drugs. The authors most important distinctions are that the dopes neither produce intense craving nor marked abstinence symptoms that they may include not only drugs but also food that the consciousness of the individual is not diminished and that they include certain substances which exert stimulating or depressant effects on organs other than the central nervous system.

The authors classify dopes in three main groups. Group I comprises drugs used as dopes. Group II food and dietetic preparation and Group III the purine derivative. There is also an interesting note upon the betel leaf and areca nut. We have not the space to summarize the account of all the materials discussed and indeed some of them such as alcohol ether the barbiturates chloral paraldehyde etc. do not conform with one of the authors main criteria viz that the dope do not diminish the consciousness of the individual moreover cocaine which they also include is generally regarded as a true addiction drug nor can the cocaine habit be classified as a minor one. A rather interesting article extant concerning these we will present them by on this occasion.

Excluding then the most interesting accounts of substances considered in Group I relate to the use of melling salts benzedrine caffeine certain circulatory stimulants and depressants endocrine preparation and some metallic substances.

Smell salts are stated to be particularly used by clerks and persons in sedentary occupations chiefly in the Bengal Bombay and Madras Presidency. Used to excess they may provoke rhinitis and sinusitis and it has also been noted that their prolonged use leads to a craving.

The benzedrine habit has been found among some of the members of the medical and allied professions but it has not spread to the general public. No evidence however of a true addiction has come to the notice of the author. Among those who have contracted the habit loss of appetite dryness of the mouth disturbed sleep sweating and palpitation have been noticed. Beneficial as the drug is in selected cases its abuse is to be deprecated.

Caffeine an alkaloid form is not used as a habit forming drug but as tea and coffee the two of the common doping agents used in India. Coffee in South India has displaced all other beverages. The effects of over indulgence in the drink are described and resemble those in elsewhere. However indulgence is not however very common in India.

Of the aromatic analgesics a pyrim and coal tar derivatives are commoned in India. Their prolonged use may give rise to palpitation eating and a throb.

Among the cardiac stimulants camphor is commonly used in India. It may be used as the essential oil or sometimes as an ingredient in the betel morsel or sometimes in pill form. In large doses the drug may lead to a state of intoxication or even unconsciousness but in small doses some persons exhibit an alert condition with a rapid flow of ideas. The authors have also met with a few instances of *ephedrine* habit. In one case there was bradycardia and when the drug was withdrawn the pulse became feeble and there was a general asthenia.

Among the endocrine preparation the authors have met with a few instances of the abuse of thyroid preparations with very serious results in some cases. But of far greater significance is the abuse of preparations of the metals *arsenic* and *mercury*. As regards *arsenic* there are

many persons in India who take it habitually. It is generally taken mixed with butter or with sugar in the belief that it improves the general health and also as a prophylactic against certain infectious diseases and sometimes as an aphrodisiac. Its habitual use does not lead to any marked craving but in cases of long duration there may be abstinence symptoms on withdrawal which usually include epigastric pain diarrhoea asthenia and sometimes even collapse.

In respect of mercury this is employed in the form of certain native preparations the chief of which are *shingraf* and *nal aradhuaja*. The authors do not state the composition of these. Mercury is believed by many Indians to be an excellent sexual and general tonic and is sometimes habitually taken with this in view.

Of preparations mentioned under Group II we can do no more than note that according to the author the use of vitamin preparations is extremely popular in India and there is a voracious demand for them. While the effects of excessive indulgence in concentrated vitamin preparation have not been fully worked out the possibility of their doing harm cannot be overlooked. Group III deals with tea and coffee which have already been considered.

A long note on betel chewing concludes the two papers. The authors have examined 400 habitual betel chewers and find that excessive indulgence results in many pathological changes among which are mentioned dental troubles oralsepsis dyspepsia palpitations neurosis and slow cerebriation. More serious however is the evidence that betel chewing definitely predisposes to carcinomatous growths of the mouth. The authors emphasize however that in their series the grave effects were observed only in excessive consumers not in moderate or occasional indulgers. They speak with authority for they have examined in all over one thousand betel chewers. On the whole they conclude that the objections to the habit are less serious than those to alcohol and tobacco.

E. H. Adams

WIGGLESWORTH (V. B.) Some Notes on the Integument of Insects in Relation to the Entry of Contact Insecticides—*Bull. Entom. Res.* 1942 Sept Vol 33 Pt 3 pp 205-218 With 6 figs [20 refs.]

The purpose of this paper is to show some of the ways in which the structure and physiology of the insect cuticle influence the entry of insecticides particularly extracts of Pyrethrum in contact with it. Most of the experiments consisted in the application of Pyrethrum extracts to a constant area on the back of *Rhodnius prolixus* confined by a small glass ring cemented to the cuticle and the recording of the rate at which symptoms of paralysis developed. The outermost layer of the cuticle is of a lipid nature and the entry of Pyrethrum becomes progressively more rapid as it is dissolved in lighter and lighter petroleum oils in which the lipoids dissolve more readily. It enters extremely slowly when dissolved in vegetable oils. Entry becomes slower as the inner layers of the cuticle increase in thickness as they do after the insect is fed. It is more rapid if the cuticle is stretched. In the adult *Rhodnius* entry takes place apparently chiefly through the ducts of the numerous dermal glands. Applied under these conditions the entry of Pyrethrum in the heavier petroleum oils is accelerated if 5 per cent of oleic or some other long chain fatty acid is added.

V. B. Wigglesworth

MELNIKOV (N N) & SUKHAREVA (N D) & FEDDER (M L) Struktura
and Insecticidal Properties of Organic Compounds.—C R Acad
Sci L R S S Moscow 1941 Vol 31 No 6 pp 610-613
1942 ref Summary taken from Rev Applied Entom Ser B
1942 Sept Vol 30 Pt 9 p 144]

Since systematic investigation of large group of organic compounds could probably show that certain substances non injurious to man and the higher animal possess insecticidal properties and so could be used to control the vector of diseases known to be transmitted by insect a series of ester of chloroacetic thiocyanacetic and α thio-cyanobutyric acids were synthesized by methods that are described and their minimum concentration in emulsions of soap and water lethal to *P. discalis* *limburus* L. (the former Nitzsch) were determined by immersion on Ethyl acetate and pentyl acetate and for comparison on The thiocyanacetates. It also tested again eggs of *P. humanus* and again eggs and other stages of *Culex lectidarius* L. From the results which are shown in a table it is deduced that ester of acids containing a substituted thiocyanoradicle ($\sim N$) are much more potent insecticide than the corresponding ester of acids containing a substituted chlorine (Cl) or ester having no substituted group in the substituted carbon radical of the acid that insecticidal efficiency increases with the increase of the molecular weight of the alcohol radicle and increase in the α thiocyanobutyrate to a maximum in pentyl α thiocyanobutyrate and then decreases that in the majority of the case as the molecular weight of the hydrocarbon radicle of the acid increased and that the insecticidal efficiency of alkyl thiocyanacetate and alkyl α thiocyanobutyrate differ little from that of the corresponding propylesters

RICHARD (A G) Jr Differentiation between Toxins and Sulfocarb
Effects of Petroleum Oils on Larvae of the House Mosquito (*Culex*
p. pens. (Diptera).—Trans Amer Ent Soc Philadelphia Pa
1941 Vol 67 No 3 pp 161-193 With 4 plates Summary
taken from Rev Applied Entom Ser B 1942 Aug Vol 30
Pt 8 pp 194-195

Evidence has accumulated to show that the more volatile petroleum oils have a directly toxic effect on insects and it has been presumed that since the non-volatile oils kill only slowly and are generally considered as non-toxic their insecticidal effect must be due to a physical action. The literature does not show whether or not a physical action is an added factor in death due to toxic oil. An account is given of experiments carried out with larvae of *Culex pipiens* L. which showed that suffocation and oil toxicity produce different histopathological pictures in the central nervous system both of which may be observed in lethargic larvae capable of recovery and that all oil whether volatile or non-volatile as a wall applied in mosquito control lead to histologically demonstrable effects of suffocation. With extremely toxic oil the results materially alter the time needed to kill. With less toxic oil the results are rather variable but a mean acceleration of killing time is imposed when a physical action is also a factor. Larvae submerged in water of

low oxygen content die in about 70 minutes but in aerated water cutaneous respiration can sustain life for considerable periods. Immersion of larvae in aerated paraffin oil and non volatile oil did not prevent them from respiring if the cuticle was dried before immersion but death followed promptly when the cuticle was wet. It is concluded that air dried larvae immersed in aerated paraffin oil probably do not die from asphyxiation and that adequate cutaneous respiration depends on direct contact between the oil and the cuticle. A summary and discussion are given of the literature on the suffocation of mosquito larvae and a discussion of cutaneous respiration in insects with particular reference to such respiration in water and in oil.

HAFEZ (M) Investigations into the Problem of Fly Control in Egypt — Bull Soc Fouad Ier Ent Cairo 1941 Vol 25 pp 99-144
With 2 figs [101 refs] [Summary taken from *Re Applied Entom Ser B* 1942 Sept Vol 30 Pt 9 pp 136-138]

This paper deals with extensive field observations and experiments on fly control in rural and urban areas of Egypt made over a period of about two years. Typical observations on breeding media and oviposition experiments are described for the principal species or groups of species considered. It is shown that *Musca domestica vicina* Macq. the most abundant and important of the house frequenting flies that may carry the crucial organisms of prevalent diseases utilises as breeding media in addition to horse and donkey dung human excrement which is allowed to accumulate in heaps in or near the villages and to a smaller extent the dung of sheep and goats. The latter is more important than pig dung. Breeding also takes place in heaps of mixed dung containing a proportion of favoured kinds and in fowl droppings and household refuse but hardly at all in cow or buffalo dung alone. *M. vetustissima* Wlk. *M. sorbens* Wied. *M. vitripennis* Mg. *M. tempestiva* Fall. *M. nebulosa* F. and *Phaenatomia* (M) *crassirostris* Stein which are scarce in towns breed chiefly in cow and buffalo dung in byres and in heaps on the farms as the temperature generated during fermentation is only 30-35°C (86-95°F) and is very favourable to their development. Sheep and goat dung and human excrement are also attractive the last particularly to *M. tempestiva* and *M. sorbens*. The two species will also breed in horse dung particularly when it is mixed with that of bovines. Pig donkey and fowl dung and household refuse are unattractive. *Stomoxys calcitrans* L. breeds in the bedding in byres and calf pens in the country and in horse bedding removed from stables and exposed in the open near towns but pure dung is not very attractive to it. Donkey dung deposited in stables and mixed with litter is sometimes used in the country but sheep goat and pig dung and human excrement very seldom. *Calliphora erythrocephala* Mg. *Lucilia sicula* Mg. and *Muscina stabulans* Fall. are chiefly attracted to carrion but owing to its rare occurrence breed chiefly in human excrement. *M. stabulans* may breed in cow and horse dung and occasionally in household refuse. The efficiency of various methods for the control of breeding in horse dung was tested and their value is discussed. It is concluded that the most effective method is to induce fermentation which will raise the temperature of the breeding medium above the lethal limit by packing and watering the dung and turning over the upper layer in a

receptacle designed for the purpose. It is a rectangular three sided wooden box about 6 ft long 3 ft wide and 20 ins high lined with zinc. The open front has a channel in which larvae that develop in the cooler outer layers of dung and try to escape are trapped in borax solution (4 oz borax to 1½ gal water) and there is a ledge projecting inward to prevent any larvae from escaping upwards. The channel is protected from falling manure by a shutter. Two boxes are kept for alternate use. Dung is rammed into one every day until it is full but a space of 10 in between the surface of the heap and the channel and one of 6 in between the surface of the heap and the projecting ledge. The borax solution is renewed daily after the liquid manure has been drained from the channel, when the box is full the shutter is fitted to the front and the dung left to finish fermenting the surface being turned over and water added daily. During this time the second box is filled. The temperature generated in the centre of the heap (66-90° C [150-197° F]) is sufficient to destroy all immature stages. A table is given showing the period of exposure to temperatures varying from 45 to 55° C [113 to 131° F] necessary to kill larvae in various stages of development. The longer exposure required varies 10 minutes for mature larvae at 45° C. Although the upper surface of the manure is left exposed no deposition takes place in it as the fermenting dung is as exposed after fermentation with egg are laid when the dung is as fertile as not impaired. The value of the dung as a fertilizer is not impaired. It is recommended that this method be used in conjunction with supplementary measures such as the application of insecticides. No stables for animal other than horses should be accumulated outside the stable

straw should be changed frequently and should be accumulated outside the stable and dried in dishes to be used as fuel. This practice which is a common method of disposing of cow and buffalo dung is described. It was found that third instar larvae can complete development in the dishes but younger ones cannot. The dung must therefore be dealt with within 74 hours so that the dishes then formed do not contain third instar larvae. The number of flies on farms where this practice was adopted was reduced to a tolerable minimum within about a month. On large farms the dung is accumulated in very large tanks for use on the fields. The other method and buffalo dung during fermentation is not lethal to the larvae. It is recommended that such heap should be kept to a manageable size a solution of 1½ oz borax in 2½ gal water sprinkled over the heap the insecticide should be applied with a thick layer of earth to the surface covered with a thick layer of earth to prevent the odour from attracting the flies. In addition to these methods directed against breeding on a large scale breed in smaller accumulations of media should be reduced to a minimum by promptly burning garbage disposing of the contents of cesspits in a place about a mile from the town or village and combine them with earth cleaner road yards etc removing the fowl dung accumulated in houses and burying dead animals.

HAFEZ (M) A Study of the Biology of the Egyptian Common House Fly *Musca vicina* Macq (Diptera Muscidae) — *Bull Soc Fouad Ier Ent* Cairo 1941 Vol 25 pp 163-189 With 9 figs [51 refs]

HARELL (William B) & MOSELEY (Vince) The Surgical Treatment of Subdermal Myiasis due to *Dermatobia Hominis* — *Southern Med J* 1942 Aug Vol 35 No 8 pp 720-723 With 4 figs

The history of infection by a larva of *Dermatobia hominis* is usually that the patient observes a small red raised spot which he mistakes for a mosquito bite thus enlarges to resemble a furuncle but is not very tender though there may be intermittent sharp neuralgic pain with the sensation of something crawling beneath the skin. Inflammation is usually moderate with little surrounding reaction but if the larva is active a bubble shows at the crater.

For successful treatment the larva must be removed completely the invaded tissue cleansed and the devitalized tissue dealt with to prevent necrosis and abscess formation. To seize and remove an active larva is difficult injection of ether or chloroform kills the larvae but causes the patient no little pain and may give rise to wide sloughing and healing is slow.

The following is the authors technique. The site is cleansed and a 2 per cent aqueous solution of procaine hydrochloride is injected intracutaneously in a circle of weals round the lesion and a spoke pattern of subdermal injections through the weals. The larva is then anaesthetized by injection into the larval cavitation. Bubbling ceases and the crawling sensation is no longer felt. As a rule about 10 cc of the injection will suffice. An incision is then made the larva lifted out the track irrigated with normal saline and lightly curetted then packed with a mixture of sulphadiazide and sulphathiazole in equal parts which prevents the suppuration common with the previous methods of treatment. The wound is now closed with interrupted small dermal sutures. Convalescence is rapid in fact the patient may keep up and about and need not be confined to bed. H Harold Scott

GUNTSCHEFF (Nikola) Myiasis linguae—2 Maden der Wohlfurtenia magnifica in den Papillae circumvallatae einer vorher gesunden Zunge [Myiasis of the Tongue Occurrence of Two Larvae of *W. magnifica* in Circumvallate Papillae of Previously Healthy Tongue] — *Deut Ztschr f Chirurgie* 1942 July 20 Vol 255 No 11 & 12 pp 751-755 [11 refs]

Careful clinical description of a single case in man in Bulgaria

P A Buxton

FISCHER (Otto) Die Beurteilung der Eignung fur den Aufenthalt in den Tropen [Fitness for Life in the Tropics] — *Muench Med Woch* 1942 Jan 30 Vol 89 No 5 pp 93-98

This paper is written in the most general terms and there is little attempt to prove the statements made by reference to investigations undertaken or to experience gained in actual practice. It consists largely of a list of diseases or abnormalities which are likely to be adversely affected by tropical conditions or which should be corrected before going to the tropics. The importance of general health is stressed and emphasis is laid upon diseases of the nervous system and

[January 1943]

on the fact that not only climatic condition but also social surroundings are often very different in the tropics from those in Europe and that in judgment of suitability the physician should take into account the whole personality of the prospective emigrant. C II

HEISS (F) Hitzeschaden und ihre Behandlung [The Effects of Heat and their Treatment]—*Med Klin* 1942 Aug 7 Vol 38 No 32 pp 749-751

The author's descriptions of heat collapse, heat cramp and heat stroke do not differ from those generally given. He mentions the sequelae of heat stroke which may include herpes labialis and paralytic rigidity of the trigeminal nerve in addition to the cerebral and psychomotor changes which are more commonly known. In treatment he does not propose any new ideas but notes that in the case of the sequelae medical observation should not be renounced too soon.

The author accepts the view that a stroke is due to an effect of the rays of the sun on the meninges and gives rise to serious meningitis with stiffening of the neck and Kern's sign. He states that the back of the neck on account of the closeness of the medulla to the surface is the most vulnerable part of the body to the sun's rays and emphasizes the necessity for protection. This is the old view. The author produces no evidence in support of his domestication of the sun. C II

TENNANT (H) Dauerchaden durch Hitzschlag [Permanent Damage from Heat Stroke]—*Wochschr Med* 1940 July 10 Vol 89 No 28 p 692

Permanent damage results from heat stroke is rare. Cerebral lesions, epilepsy, hysteria, tachycardia and myocardial injury have been described. The author records the case of a soldier aged 28 who collapsed and became unconscious during a march in June 1940. On arrival in hospital he was found to have some paralysis of the left arm and leg with diminished patellar reflexes. Speech was low, the tongue protruded to the left, there was a paretic paralysis of the left arm and leg but reflexes were equal. The patient was nervous. The condition which was present six months later may have been due to vascular damage in the acute phase. It resembled acute encephalitis which has been described in connection with subsequent degeneration in the cerebral ganglia. C II

GONZÁLEZ PRIETO (J) LÓPEZ DE AZCONA (J M) AZÚA (L) BONDEU (F) & CARDENAS (M) In taciones experimentales sobre un caso de urticaria solar [Experimental Investigation of a Case of Solar Urticaria]—*Rev Clin Espanola* 1940 Feb 15 Vol 4 No 3 pp 173-175 With 4 figs [12 refs] French summary

A woman 35 years of age without any preceding illness became an itchy urticarial case in 1939 to suffer from red spots and erythema during a hot stay by the sea. She had a severe erythema attack of urticaria with violent headache and high fever since that time. Exposure to the

rays of the sun for a few seconds has been followed by an outbreak of weals very irritating and becoming confluent. The authors proceeded to carry out three series of experiments —

(1) *Experimental Production of Urticaria* — The patient's shoulder was exposed to the light of a quartz lamp at a distance of 60 cm for 40 seconds. Four minutes later an erythema appeared intensely itching then in the centre there developed small weals which became confluent to form one huge weal the size of the erythematous patch raised 3–4 mm. It lasted thus for half an hour then began to fade and had disappeared altogether in 40 minutes. Further experiments showed that exposure for 3 seconds led to erythema and pruritus without urticaria but 5 seconds or more produced urticaria alone. Exposure for 6 minutes to a Solux lamp at 40 cm distance caused no change in the skin — the rays of the visible spectrum near the red and the infra red are devoid of any urticarial effects. Next they found that rays of a length above 3000 Å i.e. between the ultra violet and the visible spectrum were those causing the urticaria and in this patient rays between 2000 and 3400 Å in particular 3200 Å.

(2) *Study of the Mechanism of the Urticarial Reaction* — First the authors found that the outbreak of solar urticaria was accompanied by haemoclastic shock with leucopenia and lymphocytosis (leucocytes reduced by 4 minutes exposure to the lamp at 60 cm from 8,000 to 5,700 per cmm and arterial tension was lowered). Next on the hypothesis that the urticaria was an allergic reaction they tried to demonstrate the antigen which provoked the reaction to the sun's rays. They showed by gastric analyses that the radiation did not set free histamine at all events in quantity sufficient to stimulate the gastric secretion.

One of the authors then injected into his forearm 0.2 cc. of the patient's serum and covered the site to protect from the luminous rays.

Twenty-four hours later he exposed them to the quartz lamp for 5 minutes and after another 15 minutes the sites of injection became weals the size of a bean with a red itching periphery persisting for 2 hours. It was clear that the patient's serum contained a substance capable of reacting with something which is set free in other individuals on exposure to radiations of a certain wavelength.

(3) *Attempts at Treatment* — It was not possible to lower the patient's susceptibility to the sun's rays so the authors tried to find something which would protect her from the radiations and finally prepared a cream containing chloride of copper 3 gm, distilled water, valone and lanolin of each 10 gm. [This the authors call 3 per cent of CuCl_2 throughout the paper and state that in this strength it can be used daily without harm. The strength of the preparation is of course 10 per cent.] The skin smeared with this and another part for control were exposed to the lamp for 6 minutes. The protected zone showed no change the control area in 3½ minutes was red and irritating and later urticarial.

H. Harold Scott

SONNENSCHIEIN (Curt) Haus und Krankenhausbau in den Tropen [House and Hospital Construction in the Tropics] — *Deut. Trop. Ztschr.* 1941 June 1 Vol 45 No 11 pp 326–334 With 10 figs.

This article which is well illustrated consists chiefly of a general statement of the many points to which attention must be paid by

TROPICAL DISEASES
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[No 2

SUMMARY OF RECENT ABSTRACTS *
II YELLOW FEVER*Epidemiology*

In the Rockefeller Foundation Review for 1940 (p 64) it is pointed out that in susceptible wild animals inoculated with yellow fever virus in South America illness is not as a rule produced but the virus is present in the circulating blood for some days during which time the animals are in active movement. This circumstance is favourable to the spread of the virus. The susceptible animals include primates, marsupials, edentates and rodents. The author of the review considers yellow fever to be primarily a disease of jungle animals with the man Aedes man cycle as a secondary phenomenon. Transmission from animal to animal appears to be effected by jungle mosquitoes. There is however no animal reservoir in the accepted sense the virus is only present in the blood for a few days after which it disappears and does not return. Mosquitoes tend to harbour the virus for the rest of their lives which may last for several months.

FINDLAY (p 65) shows in two maps that positive results to tests for immune bodies have been found in areas of Africa considerably wider than those in which definite cases of yellow fever have been recognized. At the same time yellow fever is found in isolated cases without apparent relationship to epidemics. Epidemics occur in towns and in rural areas and the disease is also endemic in country districts. The largest rural epidemic known was that which recently took place in the Sudan but others have been reported from West Africa. In these although it is impossible to exclude *Aedes aegypti* as a vector it is possible that other species play an accessory rôle. Endemic yellow fever may be maintained by the mosquito man cycle and although it is known that the blood of many wild and domestic animals contains protective bodies which presumably indicate past infection in Findlay's view the important factors in spread are the infected man and the infected mosquito rather than infected animals. [This is an opinion which does not accord with that expressed above in the Rockefeller Report it may be that the situation in Africa is

The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin* 1941. Vol 39. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed (391)

unlike that in S. America. To the reviewer it seems that there is probably much truth in both contentions. Endemic yellow fever has undoubtedly occurred in Africa without recognition at the time and mild cases are not uncommon. Such endemic disease could flare up to epidemic proportions if there were for any reason a large-scale infection of vector mosquitoes. On the other hand even in the absence of proof of wide infection of animals in Africa it is not probable that the findings in the animals of S. America referred to above hold good for that continent alone. More work on the forest animals and mosquitoes of Africa is evidently necessary for a solution of this problem.]

FINDLAY *et al* (p. 455) have mapped out the incidence of immune bodies in the Sudan. The northern border of the endemic area runs from the Sahara to the Abyssinian border probably to the edge of the Abyssinian plateau. To the south it merges into the endemic areas of Uganda, the Belgian Congo and French West Africa. Positive results have been obtained with the sera of domestic animals and certain primates but the true significance of the former is not clear. Since such reactions have also been obtained in non-endemic areas

KIRK (p. 69) notes that in the Nuba mountains of the Sudan where the great epidemic occurred monkeys and hedgehogs both susceptible animals were found. There is as however no evidence of an epizootic in the animals [but if the conditions while the animals remain clinically it is possible that the virus circulates while the animals remain clinically little affected]. The evidence of protection tests or at post indicates that the virus is present in the area long before the outbreak and the actual cause of the rapid expansion is not clear.

Kirk reports some 15,000 cases and 1,600 deaths. In many cases the diagnosis was confirmed either by protection tests or at post mortem but it is noted that there are many mild cases which might in other circumstances have been regarded as influenza and fly fever or the like. The most severe cases conformed to the classical type. In the Report of the Eastern Bureau of the League of Nations for 1940 (p. 72) it is noted that the area of the Sudan epidemic lies a way from the main communications [a point also brought out by Kirk]. It is thought therefore that the outbreak was not due to imported infection especially in view of the fact that yellow fever has been present for some years.

HUGHES *et al* (p. 455) have tested about 4,000 sera for protective antibody in Uganda. No positive results were obtained in children in the eastern central or southern regions but in the west immunization rates of 17 to 99.6 per cent were found. The highest being in the area bordering the Ituri forest. This suggests continuous infection but in spite of intensive investigation for three years no clinical case had at that time been discovered. Later however VLAHAKIS *et al* (p. 759) found two cases in the Bwamba area of western Uganda in which a diagnosis of yellow fever seemed to be justified. The virus was isolated from one. In addition two strains of virus were isolated from wild caught *Aedes simpsoni* the most prevalent mosquito. Protection tests indicate an important focus along the Semliki river. West of the Ruwenzori mountains especially close to the uninhabited forest.

BABLET (p. 760) inclines to the opinion that the jungle form of yellow fever exists in French Equatorial Africa but does not give detail of any animal reservoir. Scattered cases have been found in man from

the Gabon coast Brazzaville the Oubangui Chari region and near Lake Chad and from the evidence of protection tests and viscerotomy specimens these areas are thought to be fairly extensively affected

Aetiology

The two strains of virus isolated by MAHAFFY *et al* (p 456) from mild cases of yellow fever in the Sudan were both found to be identical with strains isolated in other parts of the world
 FINDLAY (p 76f) has shown that a large proportion of mice develop encephalitis after being starved for 24 hours then given insulin in a dose of 0.8 units per kgm body weight and then an intraperitoneal injection of neurotropic virus A similar result takes place if the mice are treated with coal gas in place of insulin The effect of insulin shock and of coal gas is to induce oxygen deficiency and it is probable that this damages the blood brain barrier and allows the virus to pass into the central nervous system

Transmission

KIRK (p 69) notes that in the Sudan epidemic *Aedes aegypti* was present throughout the affected area Though essentially a domestic species it was found breeding in the Nuba mountains 2-3 miles from the nearest house *Aedes vittatus* another known potential vector was also found LEWIS *et al* (p 68a) have proved that *Aedes taylori* *Aedes metallicus* and the pale form of *Aedes aegypti* are all capable of transmitting yellow fever by bite The first two species are abundant in the Nuba mountains of the Sudan where the epidemic of 1940 occurred As mentioned above MAHAFFY *et al* (p 759) have isolated the virus from wild caught *Aedes simpsoni* in western Uganda
 In the Review of the Rockefeller Foundation for 1941 (p 61a) it is pointed out that species of *Aedes* known to be capable transmitting yellow fever in the jungles of S America are tree top dwellers
 ROZEBOOV (p 74) has shown experimentally that in climates too cold in winter for *Aedes aegypti* to breed throughout the year eggs may survive the cold weather even though the temperature may be below freezing point for several days together if maintained on sand and protected from snow and run Hatching took place when the eggs were immersed in water in the spring

TETSDALE (p 833) reports that *Aedes simpsoni* *Aedes aegypti* *Aedes metallicus* and *Aedes pembaensis* have been found breeding in collections of water in pineapple and banana plants in Mombasa
 BANANA TREES
 may hold water throughout the year

Pathological and Clinical Findings

VILLELA (p 74) describes in detail the histopathology of the liver in fatal cases of yellow fever He gives an account of mid zone necrosis and of the Councilman bodies [In comment FINDLAY points out that intranuclear inclusions may be present in 20-70 per cent of liver specimens in yellow fever the incidence apparently varies in different outbreaks] Villela describes certain bright ochre coloured granules scattered among the Councilman bodies and claims that the presence of these ochre bodies can be used as a basis for the diagnosis of yellow

fever provided that certain other suggestive changes are found —fatty degeneration in the mid zone with jumbling of the trabeculae increase in size of the nuclei of parenchymatous cells hyperplasia of Kupffer cells and the presence of leucocytes in the mid zone For fuller information the original abstract should be consulted

SMITH (p 686) reports on the histological examination of the liver in 14 cases of jaundice in West Africa which clinically had suggested yellow fever The histological appearances excluded yellow fever but the aetiology of the condition was not known [see also GAST GALVIS below]

FINDLAY *et al* (p 457) report that during the Sudan epidemic there were subsidiary outbreaks of relapsing fever and infective hepatitis and how by a detailed statement of the common symptoms of these diseases how easily they may be confused with yellow fever They point out the importance of laboratories equipped for virus isolation viscerotomy services and mosquito protection tests in countries where yellow fever may exist

DUFF (p 76) emphasizes the importance of albuminuria markedly increasing from the second or third day in the diagnosis of yellow fever He points out that jaundice and haemorrhages are later signs and that in mild cases jaundice may be hard to detect

KIRK *et al* (p 457) report five cases in Europeans in the Nuba mountains of the Sudan during the epidemic All were relatively mild

Control of Immunity

FINDLAY (p 65) draws attention to the importance of accurate and early diagnosis in the control of yellow fever this depends on liver examination protection tests or the isolation of virus from the blood He gives an account of the principle of control of the disease and urges co-ordination between the countries concerned In the Report for 1940 of the Eastern Bureau of the League of Nations (p 7) the steps taken by the Sudan Government to control the recent epidemic are outlined

GAST GALVIS (p 73) reports on the first 5 000 specimens of liver collected at 117 viscerotomy posts in Colombia from 1934 to 1940 In 196 cases the diagnosis of yellow fever was made and by means of this service it has been possible not only to prove the presence of the disease in areas in which it was not previously suspected but also to show that it is absent in other places apparently favourable to its propagation The service is useful in detecting fatal cases of malaria and has also shown that certain cases of massive necrosis of the liver which occurred in two districts and were formerly confused with yellow fever were not due to that disease the aetiology is still unknown [In view of the value of this service in diagnosis and in control of yellow fever it would seem important to institute it on a large scale in Africa]

HARGETT (p 458) describes the procedure for the disinsectization of aircraft with an extract of *Pyrethrum* in deobase oil

LE VAN (p 76) shows that *Gambusia* are useful in eliminating larvae of *Aedes aegypti* from wells and cisterns

In the Rockefeller Report (p 64) it is pointed out that for jungle yellow fever the most important control measure is vaccination but for urban areas the control of *Aedes aegypti* is as important as ever If this mosquito was eliminated from towns the risk of transmission by fast travelling vehicles to India and the East could be avoided

SAWYER (p 683) in a summary of the epidemiological features of yellow fever notes that jungle yellow fever exists in South America both as an endemic disease and as migrating epidemics. Prevention includes control of *Aedes aegypti* in cities and towns but the only practicable measure against the jungle form is vaccination.

SELLARDS (p 78) considers that effective immunization requires the injection of living modified virus and the development of infection. In view of the severe reactions which sometimes follow the use of living neurotropic virus from mice he has tested the French neurotropic strain by injecting very dilute suspensions into the cisterna magna of monkeys. With these great dilutions no clinical symptoms were produced but immunization was effected in most of the animals. After intracerebral injection on the other hand death usually occurred from encephalitis.

SMITH *et al* (p 77) failed to find significant difference in the immunizing efficiency of three batches of vaccine prepared from the strain 17D after 212, 342 and 450 subcultures respectively in tissue culture. There were however considerable variations in the antibody responses of different individuals to the same doses.

PELTIER *et al* (p 761) report on the use of mixed vaccines against yellow fever and smallpox applied by the scarification method. The yellow fever vaccine consisted of a neurotropic strain. Almost 100 000 natives of Senegal have been immunized by this method and serum protection tests against yellow fever were found to be positive after vaccination in 95 per cent of those vaccinated, the immunity lasting for at least one year. [The same authors (this *Bulletin* 1940 Vol 37 p 92) have previously shown that this method produced a high proportion of positive results in blood previously negative.] The smallpox vaccine produced results similar to those seen when it is used alone. The authors are so convinced of the value of this method that they propose to extend its use to other French colonies.

BERGE and HARGETT (p 686) have shown that yellow fever vaccine prepared from strain 17D inoculated into fowl embryos and diluted either with normal human serum or with water is capable of producing anaphylaxis in guineapigs. The percentage of animals showing anaphylaxis increases with the age of the embryo used as antigen. SULZBERGER and ASHER (p 762) report three cases of urticarial reaction after yellow fever immunization. The vaccines concerned were from three separate batches.

Charles Wilcocks

MALARIA

BARLOVATZ (A) *Nouvel indice d'impaludation en milieu endémique*
[New Index of Malaria Transmission in an Endemic Locality]—
Ann Soc Belge de Méd Trop 1940 Dec 31 Vol 20 No 4
pp 407-417 With 3 charts

The best index of the intensity of malaria transmission is afforded by a study of the infection rates of infants based on the examination of the blood by the thick drop method and by spleen palpation. All infants whose spleens extend one finger's breadth or more below the costal arch are considered infected. All others have their blood examined. The results are recorded according to age groups fortnightly.

age group are convenient the first week of life is ignored. In the example given the age groups were 8 to 21 days 22 to 35 36 to 49 and so on up to 244 days. The percentage infected in each age group is charted in columnar form on transparent millimetric paper the base of the column having as many millimetres as there are days in the group and in the height each millimetre represents 1 per cent. When complete this graph is superimposed on a graph on which have been drawn frequency curves ranging from five infants per 100 per day infected to one infant per 500 days. The two curves most closely approximating the summits of the columns are selected. In the illustration given these curves represented 1 per cent and 0.67 per cent respectively. The additions or subtractions necessary to make the columns coincide with the curve are written down and added. In the example given for the 1 per cent curve the additions totalled 103 and the subtractions 137. For the 0.67 per cent curve additions totalled 207 and subtractions 60. The differences were -34 and -147 total points 181. The difference between the two curves chosen was $1 - 0.67 = 0.33$. Deduction to be made from the higher curve was $\frac{0.33 \times 34}{181} = 0.06$

$$1 - 0.06 = 0.94 \text{ per cent}$$

The index of infant infection was 0.94 per cent per day. In comparing it with indices of other groups the calculation of the probable errors would be necessary.

In a discussion of this paper it was pointed out that no count had been or could be made of the possibly numerous infants who had died of malaria infection and that the difficulty of obtaining the exact age in days of infants in native communities would be almost insurmountable.

Norman White

SCHWETZ (J) Note sur le paludisme à Irumu (Ituri Congo belge) [Note on Malaria in Irumu (Ituri Belgian Congo)]—*Ann Soc Belge de Med Trop* 1941 Sept 30 Vol 21 No 3 pp 221-224

Irumu is the capital of the Ituri district situated on a plateau 925 metres high close to the confluence of the Shari and Ituri rivers 150 km near the eastern frontier of the Belgian Congo. In 1933 the author examined 67 pupils at the rural school of Irumu. In 1939 he had an opportunity of examining 59 pupils at the same school. The results of these two examinations are compared. Both gave evidence of endemic malaria of average intensity. The proportion of children infected of *P. malariae* infection and of gametocyte carriers all decreased with increasing age. The 1939 examination however showed signs of improvement. The parasite rate of all ages 5 to 18 had fallen from 85 per cent in 1933 to 52.5 in 1939 (thick drop examination results).

No antimalaria work has been done at Irumu and there are no true seasonal changes to account for the reduction. The author concludes that the results of the examination of such small groups as these while giving a good general idea of the situation are bound to exhibit fluctuations which may not be significant.

P. falciparum is responsible for the majority of infections. It was combined with *P. alarum* in some 20 per cent of the positive films. *P. vivax* was seen twice in 1933 not at all in 1939. Both *A. gambiae* and *A. funestus* were found in adult and larval form. Adults were rarely found in European houses but considerable numbers were found in native dwellings.

Norman White

SCHWETZ (J) & BAUMANN (H) Note sur le paludisme trouve dans un village des environs de Coquilhatville et à Bikoro (Lac Tumba) [Note on Malaria in a Village near Coquilhatville and in Bikoro on Lake Tumba]—*Ann Soc Belg de Med Trop* 1941 Sept 30 Vol 21 No 3 pp 225-230

This paper gives the results of the examination of the blood of 115 inhabitants of the village of Boyera on the Congo about five kilometres from Coquilhatville and of 52 students aged 12 to 18 in the Catholic School of Bikoro on Lake Tumba. The only information hitherto published concerning malaria in the Coquilhatville area was contained in a paper published by the same authors [see this *Bulletin* 1939 Vol 36 p 777]. They had found that malaria was only feebly endemic in Coquilhatville. This applies also to the village of Boyera though admittedly the number of observations especially of young children was too few to permit of generalizations. None of six infants under two years of age was infected. Parasites were found in 5 of 12 children and adolescents aged 4 to 17 and in 16 of 97 adults. *P. malariae* was only found in two films. All this is indicative of feeble endemicity. In three films from adults trypanosomes of sleeping sickness were found.

In the Bikoro school examination by the thick drop method showed parasites in 9 of 17 boys aged 12 to 15 and in 22 of 35 aged 16 to 18. These figures indicate relatively high parasite rates but the parasites were for the most part so few in number that the examination of thin films revealed their presence in only five of the 31 positive cases. Only *P. falciparum* was found. *Microfilaria perstans* was found in 30 of the students.

Norman White

BOURGUIGNON (G C) Notes sur le paludisme à Elisabethville [Notes on Malaria in Elisabethville]—*Ann Soc Belg de Med Trop* 1940 Dec 31 Vol 20 No 4 pp 419-459 With 1 chart

During the eight years 1932 to 1939 the Laboratory of Elisabethville has examined more than 31 000 specimens of blood for malaria parasites submitted for examination for clinical reasons. The positive findings are tabulated by months for the whole period and separately for European and native residents. One can admit that such figures are a valid index of the seasonal prevalence of clinical malaria among the European residents who are under close medical supervision and who do not possess that state of premunition characteristic of the native races throughout the Congo. The significance of the presence or absence of malaria parasites in the blood of native patients whose symptoms suggest the possibility of malaria as a cause is difficult to evaluate in severely endemic and hyperendemic regions. On the high Katanga plateau on which Elisabethville is situated there is a well marked seasonal prevalence of malaria. The rainy season with abundant almost continuous rainfall lasts from early November to the end of March or mid April. There is generally a slight remission at the end of January. In the cool dry season the temperature may fall to near freezing point.

There has been a fairly constant trend in the monthly incidence of positive malaria laboratory findings. For Europeans these reach their height in April and May. In March and April there is as marked an

increase in the number of native blood preparations sent for examination. In July, August and September the cool season there is almost no clinical malaria among the European; the number of suspected clinical malaria cases among the natives is also at its lowest during these three months. The author believes that an explanation of the seasonal exacerbation of malaria is a question of the densities of *Anopheles gambiae* and *A. funestus*.

Small scale investigations were made of the parasite rates of apparently healthy natives in villages in this south east extremity of the Congo; a mean rate of 68.6 per cent was found.

The author has noted a striking variation in the morphology of the schizonts of *P. falciparum*. In acute attacks these are relatively large and numerous; in latent malaria and especially in the cool season schizonts are minute and very few in number. Nearly all the malaria in Elisabethville is due to *P. falciparum*. *P. ovale* has been found once, *P. vivax* not at all, and *P. malariae* is by no means common when found it is usually in a native child less than 8 years old. Gametocytes are much rarer in Elisabethville than in the Congo basin; they are hardly ever found in Europeans. In February and March a few may be found chiefly in native infants from 0 to 3 years of age.

[The paper is very long and somewhat discursive; a complete summary is hardly possible.]

Norman White

1. NICOLAY (F). Le paludisme à Boma en 1938 et en 1939. [Malaria in Boma in 1938 and in 1939].—*Ann. Soc. Bel. et d. Méd. Trop.* 1940 Dec 31 Vol 20 No 4 pp 479-488.
2. SCHWETZ (J). Sur le paludisme à Boma (à propos de l'étude de Nicolay). [Malaria in Boma with Special Reference to Nicolay's Observations].—*Ibid.* pp 507-513.

1. Nicolay publishes in great detail the results of the blood examination of a large number of the inhabitants of Boma and arranges them by age groups and according to the season in which the examinations were made. It is not possible to summarize his findings. He has noted a rise in the parasite rate at the end of the rainy season in April and May; a rise most marked among children aged 5 to 10. There are not more anopheline at this season but he found salivary gland infection rates of *A. gambiae* and *A. funestus* of 14 and 12 per cent respectively, compared with average annual rates of 8.9 and 5.9. *A. pharoensis* has too low infection rates and *A. nili* is too scarce for either to play any important part. He thinks that the human factor is important. The human body displays a certain fatigue at the end of the rains; spleen rates are higher than at other times and anaemia is more pronounced and more widespread.

2. Schwetz in commenting on Nicolay's findings does not consider the observations sufficient in number or consistent enough to support the deductions that have been drawn. Boma is low lying on the Congo only 90 kilometres from its mouth and in tropical condition such a place even if no quitoes be present has less numerous during the dry than during the rainy season; there are always enough and to spare. He compares Nicolay's findings with his own of 1936 and concludes that malaria conditions in Boma have undergone very little change. [See this Bulletin 1938 Vol 35 p 804.]

Norman White

- COLLIGNON (E) La campagne antipaludique de 1939 dans le département d'Alger [The Anti malarial Campaign of 1939 in Algiers]—*Arch Inst Pasteur Algerie* 1940 Vol 18 No 2 pp 221-236 With 4 plates & 2 graphs [Summary taken from *Rev Applied Entom Ser B* 1942 Oct Vol 30 Pt 10 p 148]

An account is given of the measures carried out in the campaign against Anophelines and malaria in the Department of Algiers in 1939 when there was an epidemic caused principally by *Plasmodium falciparum*. This resulted from an exceptional abundance of Anophelines following abnormally heavy rainfall and a persistent reservoir of infection and to a certain extent from an increase in susceptibility on account of the relatively low incidence of malaria in previous years. The results of the campaign were excellent but the outbreak nevertheless showed that control operations must be extended and intensified.

- SIEGFRIED (G) & IZAC (R) Le paludisme dans l'Annexe de Laghouat [Malaria in Laghouat Algeria]—*Arch Inst Pasteur Algerie* 1940 Vol 18 No 3 pp 279-294 With 2 plates & 1 map [Summary taken from *Rev Applied Entom Ser B* 1942 Oct Vol 30 Pt 10 pp 148-149]

An account is given of the topography and climate of the Dependency of Laghouat which lies between 0° 1' W and 2° E longitude and 33° and 35° N latitude. The population of Laghouat town and of the northern part of the Dependency is mainly settled while that of the southern part is nomadic. The two groups come into close contact during the winter when the nomads visit the town and village where Anophelines rarely occur as there is no water that could provide permanent breeding places. In the villages the conditions with regard to potential breeding places in each of which are described there is enough endemic malaria to give rise to short and severe epidemics when particularly favourable conditions arise. An epidemic occurred in 1939 in a very small village on the outskirts of which larvae of *Anopheles luspaniola* Theo were found in a spring among fairly dense vegetation.

- RUSSELL (Paul F) & JACOB (V P) On the Epidemiology of Malaria in the Nilgiris District Madras Presidency—*Jl Malaria Inst of India* 1942 June Vol 4 No 3 pp 349-392 With 1 map 3 charts 3 figs & 2 plates [26 refs]

Data collected from January 1940 to January 1941 form the basis of this fully documented report to which a summary cannot do full justice. The Nilgiris area about 11° 5' N in the south west of India consists of a high central plateau 35 miles long 29 miles wide containing the towns of Ootacamund (7500 feet) and Coonoor (6000 feet) descending steeply to the west to the Nilgiris portion of the Wynad tableland 3000 feet high and a steep jungly valley to the east descending through Kallar to the Mettupalayam plains which have an altitude averaging 1000 feet. Kallar is just over the border of the adjacent Coimbatore District but has been included in the survey.

Steep uninhabited cliff bound the Nilgiris on the north and south. The area is thus naturally subdivided into eastern central and western sections each of which has well marked characteristics differentiating it from the other two. Nilgiris east has a rainfall averaging 55 inches fairly well distributed throughout the year, greatest in October-November (N.E. monsoon). The streams at Kallar (1500 feet) did not have the heavy rates in October-November 1940 that sometimes occur. Nilgiris central has an average rainfall of 65 inches (Coonoor) fairly well distributed but heaviest in October-November. Nilgiris west has an average rainfall of over 150 inches more than half that amount falling in June, July and August (S.W. monsoon). 60 of the 186 inches of rain that fell in 1940 fell in June. All streams, ditches and irrigation channels were thoroughly flushed out.

The anopheline fauna of the Nilgiris is very rich. Notes are given of the breeding places of 23 species found: *A. aconitus*, *A. thomasi*, *A. annandalei*, *A. interruptus*, *A. annularis*, *A. barbirostris*, *A. culicifacies*, *A. fluviatilis*, *A. gigas*, *A. g. as. var. similensis*, *A. hyrcanus*, *A. n. er. rimus*, *A. jamesi*, *A. jayakumaris*, *A. karwari*, *A. leucosphyrus*, *A. l. radesayi*, *A. nil. ricis*, *A. maculatus*, *A. maydi*, *A. pallidus*, *A. splendidus*, *A. s. pictus*, *A. tessellatus*, *A. taenios* and *A. varuna*.

The only vector of importance is *A. fluviatilis*, it was found breeding in ricefields and irrigation channels, hill streams, river edges, spring pool and well. The largest numbers were found in hill-streams and field channels, generally with moderate or no shade but sometimes with fairly dense natural cover. Photographs illustrate types of breeding place of this species. In Nilgiris east the extremely heavy rainfall caused this running water breeding species almost to disappear from July to September. *A. fluviatilis* was found only below 4000 feet in some seasons, however with unusually high average temperatures it may appear at levels as high as 5500 feet. Adult *A. fluviatilis* were abundant in Nilgiris east throughout the year with maximum density from April to July inclusive. In Nilgiris west it was never so abundant, most were caught in May, June and August. Everywhere it was most commonly captured in human dwellings. Of 2580 *A. fluviatilis* dissected, 17.3 per cent were found infected, the oocyst and sporozoite indices being 9.7 and 10.1 per cent respectively. Of 1515 anophelines of other species dissected, none was infected. With two exceptions, all the infected specimens in Nilgiris west were taken in May and June from March 4th to January 20th. In this hyperendemic spot weekly sporozoite indices ranged from 1.5 to 34.8. Very high infection rates of this species were reported by COVELL and HARBHAGWAN in the Wynad (see this Bulletin 1940 Vol 37 p 740); there can be no doubt if any more effective vectors of malaria than *A. fluviatilis*. Spleen rates varied from 100 per cent in Kallar (Nilgiris east) and 51.9 per cent in Gudalur (Nilgiris west) to 0.9 in Coonoor (Nilgiris central). Spleen rates varied with altitude: 1000 to 1200 feet 4.4, 1200 to 2000 feet 78.1, 2000 to 4000 feet 50.4, above 4000 feet 6 per cent. Parasite rates were 33.3 per cent in Kallar, 30.7 in Gudalur and 0.3 per cent in Coonoor. *P. malariae* is the most common species in Nilgiris East, less common in Nilgiris west. Infant malaria indices in the Devala-Gudalur area of Nilgiris west ranged from 40 to 59.8 per cent. *P. malariae* produced the greatest percentage of large spleens. Half the children with *P. vivax* infections had no spleen enlargement.

when seen There is practically no malaria in the Nilgiris above 4 000 feet In exceptional years and exceptional places malaria might be acquired up to 5 500 feet

MUMFORD (Edward Philpot) Mosquitoes Malaria and the War In the Pacific—*Science* 1942 Aug 28 Vol 96 No 2487 pp 191-194 With 1 fig (map)

The author gives a general account of the distribution and importance of malaria in the Pacific Islands He touches on the importance of the Dutch East Indies as the principal source of quinine and on the danger of the introduction of malaria into Fiji or Polynesia from which Anopheles and malaria are at present absent This danger to which attention has been called frequently by British and French writers is obviously much increased by the movements of naval ships and of aircraft

It is perhaps unnecessary that the author again raises the question of the presence of Anopheles in New Caledonia We had supposed that some years ago it was settled and accepted that the records were traceable to an error

The paper does not include information as to the abundance or clinical severity of malaria in the area in which it occurs

SÖTTER (V A) & ZÚÑIGA (H) A Malaria Survey of El Salvador Central America—*Amer J Trop Med* 1942 July Vol 22 No 4 pp 387-398 With 4 figs [11 refs] P A Burton

El Salvador is the smallest of the republics on the isthmus joining North and South America It lies wholly on the Pacific seaboard facing south about latitude 14 N and is bounded on the land side by Guatemala and Honduras Its area is only about 34 000 square kilometres It is divided into 14 departments containing 259 municipalities The authors of this malaria survey were handicapped by the lack of a complete topographical map of the country the altitude of the localities surveyed was determined by them with an aneroid barometer The low coastal zone is 19 to 25 kilometres wide through which six main rivers flow to the sea Two mountain ridges traverse the country from west to east one near the coast contains numerous volcanoes 1 000 to 2 300 metres high The northern range contains a peak 2 649 metres high The country is volcanic There are only slight variations in the mean temperature January is the coolest month April or May the hottest The rainy season lasts from April to November the dry season from December to March There are 359 rivers that flow all the year round and four lakes with an average area of 30 square kilometres There are mangrove swamps in the two main coastal lagoons The estimated population is 1 766 000 52 inhabitants per square kilometre Salvadoreans are a racial mixture of Indians and Whites The general death rate in 1940 had fallen to 17.68 per 1 000 from 27.75 in 1926 and 24.5 in 1934 The malaria death rate in 1940 was 1.88 per 1 000 Hospital admissions for malaria are highest in December and January and lowest from March to May All but two of the headquarters of municipalities were visited Spleen examinations nearly all of school children numbered 23 614 blood examinations 11 354 The provincial or departmental spleen indices varied from 9 to 35 the mean rate was 22.5 per cent The blood

films were made from all children with splenomegaly and generally from one out of three with non palpable spleens. Parasites were found in 708 of the 11354 blood examined (thick drop). *P. vivax* 189, *P. falciparum* 197, *P. malariae* 144 mixed and undetermined 178. Splenic indices decreased with increasing altitude. This was also the case with the percentage of positive blood films but the difference were not statistically significant below 600 metres. *P. vivax* was most frequent in children with small spleens, both *P. falciparum* and *P. malariae* were more commonly associated with the larger spleens.

Anophelines were studied in ten localities, seven species were found. Only *A. albimanus* and *A. pseudopunctipennis* were very prevalent. *A. albimanus* prevalence varies inversely with altitude. *A. pseudopunctipennis* prevalence varies directly with altitude. *A. albimanus* was the only species found infected, there is no evidence that any other species acts as a vector of malaria in El Salvador. Norman White

KUHN (Henry W.) & ZÓNIGA (Hernán) The Mosquitoes of El Salvador.—*Amer J Trop Med* 1942 July Vol 22 No 4 pp 399-415 With 2 fig

Fifty eight species of mosquitoes were identified in this mosquito survey of El Salvador. Attention was focussed on the anopheline of which eight species were found: *A. albimanus*, *A. apimacula*, *A. argyritarsis*, *A. eiseni*, *A. neomaculipalpus*, *A. pseudopunctipennis*, *A. punctimacula*, and *A. hectoris*. The last was only found in larval or pupal form. Of the 16281 total adult catches 65.4 per cent were *A. albimanus* and 33.6 per cent *A. pseudopunctipennis*. The last named is relatively more prevalent than in either Panama or Costa Rica where it formed but 0.1 and 3.1 per cent respectively of the total anophelines caught. The corresponding percentage of *A. albimanus* in the three countries were Panama 92.7, Costa Rica 89.7 and El Salvador 65.4. The authors think rainfall affords the explanation: the average yearly rainfall of Panama and Costa Rica is about 100 inches, in El Salvador it is less than 75 inches. *A. pseudopunctipennis* in El Salvador is a dry season species. *A. albimanus* is more abundant during the rains. *A. argyritarsis* is not uncommon in larval and pupal form but adults are very rarely found. It is a vector of no importance in this part of Central America. The salt water Anopheles *A. aquasalis* Curry was not found in El Salvador.

Altitude is an important ecological factor determining anopheline distribution in El Salvador. *A. albimanus*, *A. neomaculipalpus* and *A. punctimacula* are chiefly lowland species. *A. hectoris* was found only in the highlands, there was no malaria in the two places in which it was taken. The other four species were found at all elevations. *A. pseudopunctipennis* most frequently at intermediate heights.

With regard to mosquito species other than Anopheles, it is of interest that although four species of Haemaphysalis and eight of Aedes were found, neither *A. leucoclaenus* nor *H. capricornis* the two species that have been found naturally infected with yellow fever in the forest of South America were ever found in El Salvador. Part of the epidemic of yellow fever in El Salvador all seem to have been of the urban type. Norman White

OLFF (G.) Unvollständiger Einfluss der Malaria auf die deutsche Geographie [Deleterious Effect of Malaria on German History]—*Deutsche Tropen Zeitschrift* 1941 May 1 Vol 46 No 9 pp 223-23 [19 ref.]

KITCHEN (S F) & PUTNAM (Persis) Observations on the Mechanism of the Parasite Cycle in *Falciparum* Malaria—*Amer J Trop Med* 1942 July Vol 22 No 4 pp 361-386 With 8 figs [12 refs]

The parasite cycle of *Plasmodium falciparum* infections was studied in 55 negro patients 34 of whom were infected by mosquito bite and 21 by blood inoculation. Daily observations were made and the following key points noted—day of first appearance of trophozoites day of their maximum density and day of their modal density. These points are surprisingly constant. They were unaffected by quinine when it was necessary on clinical grounds to administer the drug. Infections produced by blood inoculation the intervals were little different from those observed in natural infections. All these points to stability in the cycle. In certain patients who are naturally resistant or have acquired immunity or have been given quinine treatment the timing of certain key points may be altered but this does not mean that the preceding or following key points have necessarily been changed also. If the preceding interval or segment is lengthened then the succeeding one is shortened and *vice versa* so that the cycle is readjusted. It is suggested that this stability is an indication that the events in the parasite cycle are determined before the appearance of trophozoites in the peripheral blood and possibly at the time of inoculation. The belief is expressed that gametocyte formation begins before the end of the prepatent period and possibly soon after the inoculation of the patient. Consequently the interval of 10 days between the first appearance of trophozoites and gametocytes and between their peak densities indicates that a period for development is required by gametocytes over and above that needed for them to accumulate sufficiently to reach microscopic visibility. The paper is illustrated by a number of curves the study of which is necessary for a clear comprehension of the conclusions arrived at.

C M Wenyon

ROLBALD (E) CHORINE (V) & GUIRAUD (P) Épreuves negatives de transmission par l'anophele d'une souche ancienne de paludisme d'inoculation (*Plasmodium vivax*) [Unsuccessful Attempts to transmit an Old Inoculation Strain of *Plasmodium vivax* by Anopheles]—*Ann Inst Pasteur* 1941 Dec Vol 67 No 6 pp 462-464

The strain of *P. vivax* still being used for malaria therapy in the Saint Anne Asylum in Paris has been kept going by mechanical transmission from man to man ever since 1923. It has never been transmitted through *Anopheles* during this long period. It still produces gametocytes sometimes in quantity sufficient to infect *Anopheles* were the strain so transmissible. Two experiments are described in which two batches one of 32 the other of 40 female *A. maculipennis atroparvus* were fed on patients whose blood gametocytes were present. No mosquito became infected. No sporozoites were ever found and all attempts at infecting susceptible patients with these mosquitoes consistently failed. The authors consider that there are advantages in using for malaria therapy a strain that has lost the capacity of infecting anophelines. It obviates any danger of

malaria infection in the neighbourhood of patients where mosquito vectors of malaria may exist

In the discussion MOLLARET stated that the strain of *P. vivax* used in the Salpêtrière was eleven years old. The gametocytes had lost the power of exflagellation.

Norman White

MATEVOSIA. (Ch. M.) Découverte du Plasmodium ovale St Phillips (1922) en Arménie [P. ovalis in Armenia]—*Médecine Parasitaire & Parasitologie Dis* Moscow 1940 Vol 9 No 3 [In Russian pp 291-294 With 15 figs.]

SALTET (J.) L'anophélisme en Syrie et au Liban dans ses rapports avec le paludisme [Anopheles of Syria and Lebanon. Relation ship with Malaria.—*Bull. Mus. nat. Marseille* 1941 Vol 1 pp 106-129 With 2 plates. [Summary taken from *Rev. Applied Entom.* Ser. B 1942 Oct Vol 30 Pt 10 pp 157-153.]

A complete list of the Anopheline found in Syria and the Lebanon is drawn up from a study made by the author in 1940 and from previous records. *Anopheles sergenti* Theo. *A. superpictus* Grassi *A. pharoensis* Theo. *A. algeriensis* Theo. and *A. maculipennis* Mg. probably var. *sacharovi* Fa. r. (*clutus* Edw.) had already been recorded from the Sanjak of Alexandretta. *A. n. sacharovi* *A. superpictus* and *A. hyrcanus* Pall. were found in Syria by the author and previous workers and in addition *A. sergenti* *A. multicolor* Camb. *A. algeriensis* and *A. claviger* Mg. (*bisfurcatus* auct.) occurred in the Lebanon. The fauna of the Alaouite territory was the same. *A. claviger* is the only vector of malaria in the southern Lebanon. *A. m. sacharovi* is the most dangerous everywhere else followed by *A. superpictus* and finally *A. sergenti* and *A. multicolor*.

A. maculipennis var. *sacharovi* here develops exclusively in fresh water and *A. sergenti* and *A. superpictus* chiefly in running pebbly water. *A. multicolor* occurs in brackish water. *A. hyrcanus* and *A. algeriensis* in marshes and *A. claviger* in ci. tern and open air rural breeding place. *A. maculipennis* var. *sacharovi* is the most domestic species followed by *A. sergenti* and *A. superpictus*. *A. multicolor* also enters houses. *A. sergenti* predominate in autumn. *A. algeriensis* in winter. *A. hyrcanus* in spring and *A. superpictus* and *A. m. sacharovi* in summer and autumn.

It will be remembered that LEESON found *A. martleri* in Syria. See this Bulletin 1942 Vol 39 p 316.—*Fd.*]

DE MELLO (Botha) Estudo entomológico da colônia de Moçambique [Entomological Studies in the Colony of Mozambique]—315 pp. With numerous illustrations & 2 folding maps. 1941. Lourenço Marques. Estação Anti Malarica. Imprensa Nacional de Moçambique.]

1. Relatório acerca do vectores do paludismo em algumas partes da África Oriental Portuguesa com sugestões para o seu combate. An Account of Malaria Vectors in Parts of Portuguese East Africa with Suggestions regarding Control Measures. pp 7-44. With 1 folding map & 17 figs.

2. Relatório sobre os vectores da malária em Lourenço Marques durante a estação fria [Malaria Vectors in Lourenço Marques during the Cool Season.] pp 55-60.

At the request of the Director of the Health Services of Mozambique the author carried out an investigation of the malaria vectors in that

Colony in the first three months of 1938 a time of the year when both anophelines and malaria are most abundant in adjacent parts of South Africa. Most of the time was spent in Lourenço Marques and neighbourhood. A short visit was made to the town of Mozambique. A good account is given of the bionomics of the two chief malaria vectors of South Africa *A. gambiae* and *A. funestus* the influence of climatic conditions on their distribution and prevalence is outlined. This was the subject of a paper published by the author in 1934 [this *Bulletin* Vol 31 p 715]. *A. constanti* var *tenebrosus* a zoophilic species that hardly ever enters human habitation was found in a stable in Lourenço Marques in very large numbers. The anthropophilic species *A. gambiae* and *A. funestus* were hardly ever found in stables though they abounded in nearby human dwellings. Natives who slept in stables thus received some sort of protection from the dangerous species [this *Bulletin* 1936 Vol 33 p 245].

The important breeding places of *A. gambiae* and *A. funestus* in and around Lourenço Marques are described and suggestions are made as to the measures that might be taken to deal with them. Very good photographs and a map add interest to the description.

ii A second visit to Lourenço Marques was paid at the end of July. Active breeding of *A. funestus* and *A. gambiae* was still taking place notably in Lake Parvaio and on the sea coast at Sommerschield. The little lake is largely man made being in fact a large borrow pit but it is fed by a spring. The water was limpid and there was much aquatic vegetation. *A. funestus* was plentiful. It is proposed to deal with the danger by filling. At Sommerschield springs were also found to be responsible for the large amount of water which produced *A. gambiae* and *A. funestus* in large numbers. A costly drainage system will be necessary to remove this serious menace to health. The discussion of ways and means is of local interest only.

Norman White

DE MEILLON (Botha) Estudos entomológicos da colónia de Moçambique [Entomological Studies in the Colony of Mozambique]—315 pp With numerous illustrations & 2 folding map 1941 Lourenço Marques Estracão Anti Malarica [Imprensa Nacional de Moçambique] Relatório da Missão Entomológica da colónia de Moçambique (África Oriental Portuguesa) 22 de Fevereiro a 13 de Junho de 1940 [Report of Entomological Mission in the Colony of Mozambique Portuguese East Africa from February 22 to June 13 1940] pp 61-136 With 38 figs & 1 folding map

This preliminary report of an extensive inquiry is concerned only with Anopheles. Illustrated with excellent photographs and very well produced it makes interesting reading. It describes the conditions and the anophelines found in 37 localities from south of Lourenço Marques to the neighbourhood of Lake Nyasa. In most cases photographs of typical Anopheles breeding places are reproduced and suggestions are made as to how they might be treated. A summary of such a report is not possible. Attention can be directed however to a few facts of interest.

In all 19 species of Anopheles were identified. In nearly all the 37 localities *A. gambiae* or *A. funestus* or commonly both were found sufficient in numbers to account for all the malaria that exists. In only one locality was neither species found. This was in Furancungo.

plendidly situated at a height of 1 260 metres in the Tete Province it seems to be free from malaria. Other species of *Anopheles* were found breeding there in abundance *A. longipalpis*, *A. rhodesiensis*, *A. demeilloni*, *A. natalensis*, *A. marshalli*, *A. rufipes* and *A. coustani*. In one other place Namaacha situated at a height of 600 metres about 80 kilometres south of Lourenço Marques for the population of which it is a health resort only very few *A. funestus* were found and no *A. gambiae*. Namaacha might probably be freed from malaria.

The species of *Anopheles* identified in Mozambique arranged in the order of the number of localities in which they were found were *A. funestus*, *A. gambiae*, *A. coustani*, *A. squamosus*, *A. rufipes*, *A. rivulorum*, *A. marshalli*, *A. rhodesiensis*, *A. maculipalpis*, *A. theileri*, *A. demeilloni*, *A. longipalpis*, *A. leesoni*, *A. pharoensis*, *A. nini*, *A. seydeli*, *A. natalensis*, *A. pretoriensis* and *A. brunneipes*.

Often no larvae were found in collections of water which at first sight seemed eminently favourable for their propagation. This was specially noticeable along the coast where plantations, lagoons, lakes and rivers are numerous. In some of these there was much aquatic and subaquatic vegetation and the water was rich in organic material. The equipment of the Mission did not permit of the physical and chemical examination of water. In other collections of water the presence of large numbers of small fish probably accounted for the absence of mosquito larvae. A study of the local fish might give profitable results. Some interesting remarks are made about rice cultivation and the breeding of *A. gambiae* and *A. funestus*. Along the coast the extreme prevalence of one or two species of *Taeniorhynchus* (*Mansonioides*) makes life almost unbearable in places.

Norman White

ROCKEFELLER FOUNDATION. A REVIEW FOR 1941 [FOSDICK (Raymond B.)] pp. 17-19.—The Death of the *Gambiae*

In this review of work completed in 1941 is a most interesting reference to *Anopheles gambiae* in Brazil. Readers of this Bulletin will recall the immense outbreak of malaria which in recent years has resulted from the introduction of that mosquito from West Africa and the great efforts made to cope with it. Under the leadership of SOPER of the Rockefeller Foundation over 2 000 trained workers have moved to eradicate *A. gambiae* and it is now reported that during 1941 thorough search failed to reveal the presence of a single specimen of *A. gambiae* throughout the area once affected.

Nevertheless the danger is not over since a dead specimen has been found in a fumigated aeroplane which arrived in Brazil and others may be introduced alive as they were before in ships or aeroplanes unless strict precautions are continuously observed. *A. gambiae* could just as easily be transported to Asia. *Aedes aegypti* infected with yellow fever could be carried by air to countries hitherto untouched by that disease and a dead tsetse fly has been found in an aeroplane which arrived in Brazil from Africa.

C. H.

ROY (D. N.) & BISWAS (T. C.) On the Importance of *Anopheles pallidus* as a Carrier of Malaria in Udaipur State Central Provinces.—*Jl Malaria Inst of India* 1942 June Vol 4 No 3 pp. 417-430

Udaipur State is a hilly tract in the east of the Central Provinces of India. In Dharamjagarh its capital the spleen index of children

in August-October was found to be 60.8 per cent. The following anophelines were identified: *A. vagus*, *A. fluvialis*, *A. pallidus*, *A. culicifacies*, *A. subpictus*, *A. jayakeriensis*, *A. ramsayi*, *A. hyrcanus*, *A. aconitus*, and *A. barbrostris*. From August to October *A. pallidus* and *A. culicifacies* were by far the most frequent the former being the more prevalent of the two in August. Of 719 *A. pallidus* caught in houses and dissected six had sporozoites in the salivary glands five of 881 *A. culicifacies* caught in houses had sporozoite infections.

Norman White

AITKEN (T. H. G.) The Anopheles Complex in California (Diptera Culi-
cidae).—*Proc 6th Pacif Sci Conf 1939* Vol 4 pp 463-486
With 4 figs [4 pages of refs]

TOMITA (Masaji) Spektroskopische Untersuchungen des Malariaharns
[Spectroscopic Examination of the Urine in Malaria].—*Hoppe
Seyler's Ztschr f Physiol Chem* 1941 Sept 12 Vol 270 No 1
& 2 pp 14-15

It can hardly be doubted that in malaria the blood pigments are set free and that they appear in the urine. Pyrrol bodies after oxidation show a definite absorption band in the spectrum and this can be displayed in malaria by the following test.—concentrated HNO_3 is added to the urine when a brick red colour is developed at the line of contact and the mixture becomes generally red on shaking. An amyl alcohol extract of this pigment shows spectroscopically a sharply defined band from b to a little over the mid point between b and f (λ 517 to λ 500 $\text{m}\mu$). This may be apparent by examination of the urine alone in doubtful or negative cases the amyl alcohol extract may give the typical spectrum. Urochrome and urobilin can easily be eliminated by extraction with ether or chloroform.

The reaction is apparently specific and is usually positive in acute and chronic cases it does not appear in normal urine. It is claimed that it can be used as a test of cure.

RAO (V. Venkat) The Effect of stocking Ricefields with Sullage on
Anopheline Breeding at Khurda Road.—*Indian Med Ga* 1942
Apr Vol 77 No 4 pp 214-219 [11 refs]

This is a second report on the value of the intermittent application of sullage to rice fields during the dry season as a deterrent to anopheline breeding. [See this *Bulletin* 1942 Vol 39 p 299] In this part of India there is no irrigation properly so called the crop being dependent upon the rainfall. Rice is broadcast in the fields about the middle of June when the south west monsoon sets in it is not transplanted as in many other parts of India. The application of sullage to the fields was carried out once a week from mid February to mid May. Not more than an inch of sullage was allowed to flow into the field this was completely absorbed by the soil in four days and so provided no facilities for *Culex* breeding. Ten adjacent fields were selected for experiment five being treated the alternate fields serving as controls. The same strain of rice was sown in all. Larval samplings of all fields were made once a week from July to November inclusive. In the treated fields there was an actual increase in the breeding of non-carrier

species such as *A. subpictus* and *A. raus* but a substantial decrease in the breeding of the vector species *A. annularis* and *A. aconitus*. *A. annularis* is the most important vector. 10 larvae were found in treated field. 315 in controls. The yield of rice was about 24 per cent higher in the treated than in the untreated fields. Norman White

RUSSELL (Paul F) KNIFE (Fred W) & RAO (H Ramanatha) On the Intermittent Irrigation of Ricefields to control Malaria in South India — *Jl Malaria Inst of India* 1942 June Vol 4 No 3 pp 321-340 With 4 figs on 2 plates & 1 chart [14 refs]

This paper describes experiments to determine the value of intermittent irrigation of ricefields as a means of controlling the breeding of *A. culicifacies* in the Pattukkottai Taluk, South India. The malaria conditions in this once malaria free part of India in which the inauguration of an irrigation scheme was responsible for endemic malaria have been described in previous publications (see this Bulletin 1939 Vol 36 pp 131-187 1941 Vol 38 p 559). Seven carefully controlled experiments on rented land and two experiments in villages showed that intermittent irrigation under local conditions is an effective measure for controlling mosquito breeding when cycles of five wet followed by 2 or 3 or 4 dry days are carried out except during the period of the north-east monsoon. During the daily rain that may fall in November it is not possible to dry the fields sufficiently to prevent mosquito breeding. This is not very important for *A. culicifacies* does not breed actively at that time. It has been noted too that *A. culicifacies* does not breed actively in ricefields when the rice is a foot high. Dry periods not exceeding four days do not cause cracking or clod formation in the soil of ricefields in Pattukkottai; the surface film disappears but the subsoil remains moist. Intermittent irrigation did not significantly affect the yield of grain or straw or modify the growth of weeds. It seems possible that intermittently irrigated plots may be slightly more susceptible to fungus disease if they be present when the rice has reached the flowering stage. Village experience has shown that superfluous water in the fields during the carrying out any organized community system of irrigation. Norman White

RAO (R Bha ker) & RAMMOO (H) Some Notes on the Practical Aspects of Mosquito Control in Wells and Tanks by the Use of Larvivorous Fish — *Jl Malaria Inst of India* 1942 June Vol 4 No 3 pp 341-347 With 2 figs on 1 plate

The authors describe some of their experiences in an endeavour to control mosquito breeding in tanks and wells in Pattukkottai town by stocking them with *Gambusia* or with *Panchax parvus*, a local species. There are 1300 wells in the town mostly very shallow unprotected wells. About 20 to 25 fish were put into each well but it is weeks later most of them had disappeared. Predatory fish were responsible for the loss in some cases. Chlorination of the water was used to kill the latter. Five to six ounces of perchloron was sufficient for 800 gallons of water. Larvivorous fish are introduced when all traces of free chlorine have disappeared from the water. Frogs are commonly

found in the wells and have been known to eat fish. In support of this surprising statement a photograph is published showing a fish inside a frog's stomach. [One would imagine such an occurrence to be rare.] A wire screen fixed for a few hours a few inches below the water surface will drown the frogs. Kingfishers are a danger to these voracious fish in the very shallow wells with no parapets. Other common natural enemies mentioned are water snakes, water turtles, predaceous beetles and giant water bugs. [It would seem that life is a dangerous business for *Gambusia* in Pattukkottai: mosquito larvae have many allies.]

Norman White

RAO (R. Bhasker) & RAMMOO (H.) The Control of Mosquito Breeding in Canal Distributaries by Growing Certain Plants on their Banks — *Jl Malaria Inst of India* 1942 June Vol 4 No 3 pp 409-415

In the Pattukkottai taluk it was noted that the breeding of *Culiseta* was more intense in canals whose banks were devoid of shrubs and creepers than in those where there was a dense marginal growth of such plants. *Ipomea biloba* a fast growing creeper is sometimes planted along the embanked portions of a canal to strengthen the bunds: it acts as a sand binder. It appears to reduce mosquito breeding. Experiments were made with other plants. *Ilex negundo* promises to be useful. It is a quick growing perennial shrub with lateral branches and thick quinquefoliate leaves which provide shade and mechanical obstruction to the oviposition of mosquitoes. It is easily propagated by cuttings. Significantly fewer larvae were found in a section of a canal whose banks had been so planted than in a control section similar in all respects save its banks' vegetation.

Norman White

KVINE (Fred W.) & RUSSELL (Paul F.) Observations on the Automatic Distribution of Paris Green — *Amer Jl Trop Med* 1942 July Vol 22 No 4 pp 447-457 With 4 figs

An automatic machine for the distribution of Paris green was first used by RUSSELL [this *Bulletin* 1933 Vol 30 p 864] and further developed by RUSSELL & EATON [this *Bulletin* 1935 Vol 32 p 144]. The machine is activated by the S rotor current wheel invented by SATONJUS (1931). Ingenious modifications have been made to the original machine which in its new form has given good results in South India in larva control on slowly moving water currents in irrigation canals. A detailed illustrated description of the apparatus is given. The machine deposits but cannot distribute the larvicide Paris green 2 per cent in powdered charcoal. The water current will however effectively distribute the larvicide in a canal up to 3 feet deep and not wider than 20 feet if the velocity of water does not exceed 1.6 feet per second. At this rate of flow or less the larvicide penetrates all grassy edges and whirlpools on both sides of the channel for at least 1500 linear feet.

Another modification of this apparatus was used to distribute Paris green kerosene water emulsion. This is also described. Much ingenuity has gone to the construction of both types.

Norman White

KNIFE (Fred W.) & SITAPATHY (N. R.) Notes on Improvements made to Equipment for Spray Killing of Adult Mosquitoes—*Amer J Trop Med* 1942 July Vol 22 No 4 pp 429-446 With 10 figs

In several reports published by Knife in collaboration with RUSSELL or alone the value of spray killing adult mosquitoes in the control of rural malaria in South India has been emphasized (see this Bulletin 1940 Vol 37 p 504 1941 Vol 38 p 645 1942 Vol 39 pp 181 & 667). In those papers descriptions were given of different types of spraying apparatus and the modifications made in many of them to suit local requirements. In this further publication a very full description is given of the equipment that has been found to be most effective and of the numerous modifications that have been made. Hand atomizers, hand pumped pressure tank equipment, self generating pressure tank equipment and power-operated equipment are described and well illustrated. A summary of the paper is not possible those interested in the subject will find much of value therein.

Norman White

MILDROW (Lilly) Klinische und parasitologische Befunde und chemotherapeutische Ergebnisse bei der Hühnermalaria [Clinical and Parasitological Findings and Chemotherapeutic Results in Fowl Malaria.—*Arch f Schiffs u Trop Hy* 1940 June Vol 44 No 6 pp 257-275 With 3 figs (1 coloured) (23 ref)

After two and a half years' experience with *Plasmodium gallinaceum* in fowls infected by blood inoculations or by the bites of mosquitoes the author has found it possible to draw certain conclusions.

The exoerythrocytic or endothelial stages of development were found in 30 per cent of the birds in the inner organ, particularly the brain. They occurred much more frequently in those that died of the infection than in those that were killed and uninfected with blood. The highest percentage of endothelial forms occurred in birds which died after porozoite infection. They occurred most frequently in birds which died in the first acute attack, while after blood inoculation they were most usually found in the later phases of the infection. In both groups the endothelial forms were most numerous when the mortality rate was highest; it would seem that the endothelial forms were in some way responsible for the death of the birds.

Microscopic examination of the injection of large number of porozoites has shown that at the end of 24 hours rounded uninucleated extra-cellular forms occurred as well as some forms with two nuclei. After 48 hours numerous uninucleated and binucleated forms free or within mononuclear cells were found. After 72 hours intracellular forms with four and eight nuclei as well as multinucleated forms were seen. At 96 hours a larger number of multinucleated forms were seen as well as groups of sixteen merozoites evidently the products of schizogony. Up to this time it was not possible to detect pigmented parasites in the red blood corpuscles. The various developmental forms of *P. gallinaceum* which are similar to the stages previously described by the author for *P. cathemeru* are illustrated in a coloured plate.

A number of drugs were tested as to a possible action on the asexual stages. *Plasmodium* alone had any effect for the treated f

had a lower death rate and generally revealed a reduced number of endothelial forms. It seems to the author that this observation may afford an explanation of the reduced relapse rate in human malaria after plasmoquine medication if as some maintain there exist corresponding endothelial stages of development
C M Wernyon

CORRADETTI (Augusto) Die neuen Theorien ueber die Pathologie der Malaria im Lichte unserer Kenntnisse von der vergleichenden Biologie der Plasmodien [The New Theories on the Pathology of Malaria in the Light of our Knowledge of the Comparative Biology of the Plasmodia]—*Deut Trop Ztschr* 1941 Oct 1 Vol 45 No 19 pp 591-598 [30 refs]

In this paper the author continues his discussion [this *Bulletin* 1942 Vol 39 p 668] of the exoerythrocytic schizonts which occur in *Plasmodium gallinaceum* infections of fowls and some other malarial parasites of birds. He brings forward experimental data to prove that these particular schizonts are not exclusively derived from sporozoites. They appear as frequently after inoculation of birds with the ordinary erythrocytic forms. He concludes that these schizonts do not indicate a separate cycle of development but represent certain biological characters of those species in which they occur. They are specific for these forms and indicate their capacity to develop in histiocytes as well as in red blood corpuscles. In the case of *P. elongatum* there is development in red blood corpuscles and blood forming cells but not in histiocytes. In the case of human malarial parasites and indeed the majority of malarial parasites as far as is at present known development occurs only in the red blood corpuscles. The isolated forms which some observers have regarded as representing exoerythrocytic stages of human malarial parasites are insufficient to establish the existence of such forms. Until evidence as clear as that which has established their existence in *P. gallinaceum* and one or two other species of bird malarial parasites is forthcoming it is quite unjustifiable to assume that such exist in human malaria much more so to conclude that they are responsible for the tendency to relapse. The general conclusion is that certain malarial parasites of birds are capable of development in histiocytes as well as in the red blood corpuscles and that this is in no way connected with the development undergone by sporozoites for in the case of most malarial parasites the vertebrate cycles of which are also commenced by sporozoites these histiocyte stages do not occur
C M Wernyon

RUSSELL (Paul F) MULLIGAN (H W) & MOHAN (Badri Nath) Active Immunization of Fowls against Sporozoites but not Trophozoites of *Plasmodium gallinaceum* by Injections of Homologous Sporozoites—*Jl Malaria Inst of India* 1942 June Vol 4 No 3 pp 311-319

In a previous paper [this *Bulletin* 1942 Vol 39 p 300] the authors described experiments which indicated that the injection into fowls of sporozoites of *Plasmodium gallinaceum* inactivated by 30 minutes exposure of the salivary glands containing them to ultra violet radiation brought about a considerable rise in the agglutination titre of the serum against homologous sporozoites. In the present paper it is shown that the same result can be obtained by the injection of an

emulsion made from dried and ground up thoraces of infected mosquitoes. This is a more rapid and convenient method of preparing sporozoite antigen than is exposure to ultra violet radiation. The paper shows furthermore that the serum of chickens immunized with the dried sporozoite antigen may reach an agglutination titre of $1/3^{rd}$ 000 and that such chickens will develop only a mild infection when bitten by infected mosquitoes. There was however no protection against the results of intravenous injection of blood containing trophozoites.

C M Henyon

RIGDON (R H) & THOMAS (W H Stratman) A Study of the Pathological Lesions in *P. knowlesi* Infection in *M. rhesus* Monkeys — *Amer Jl Trop Med* 1942 July Vol 27 No 4 pp 329-339 With 6 figs [17 refs.]

The paper gives an account of the pathology of *Plasmodium knowlesi* infection in 26 *Macacus rhesus* which either died of the infection or were killed at some stage of its development. Certain changes are similar to those which occur in human beings dying of severe anaemia. These are dilatation of the cavities of the heart leading to oedema of the lung, dilatation of the mounds round the central vein of the liver leading to necrosis of the hepatic cells around the central veins and parenchymatous degeneration of the kidneys. It seems probable that these lesions in the monkey are the direct consequence of the rapidly progressive anaemia and consequent anoxaemia brought about by the infection, an anaemia the intensity of which is related to the percentage of red blood corpuscles infected. It is in monkeys with a parasite count of over 50 per cent that the above changes are most evident. Pericardial haemorrhages were present in the central nervous system and their size and frequency varied in different animals. It is possible that these haemorrhages are the result of infarction which otherwise was rarely observed in the series of monkeys studied. Haemorrhages in the adrenal which are considered by some observers to be significant pathological lesions of malaria were rarely seen in the animals. Phagocytosis was carried out most actively by the mononuclear cells in the blood vessels and to a less extent by the polynuclears. The leucocytes in general were evenly distributed but in some places small clusters occurred. There was no tendency for leucocytes or parasitized red cells to accumulate on the walls of the blood vessels nor was there any evidence that the true endothelial cells of the blood vessels or sinusoids were phagocytic. It is suggested that in monkeys infected with the malarial parasite investigated the severity of the anaemia, the intensity of the infection and the rapidity with which the disease progresses are responsible for myocardial failure, hepatic necrosis and oedema of the lungs.

C M Henyon

RAY (J C) MUKERJEE (S) & ROY (A N) Complement Fixation Reaction in Experimental Animals in Response to *Plasmodium knowlesi* Antigen — *Ann Biochem & Experim Med* Calcutta 1941 Mar Vol 1 No 1 pp 101-115

With antisera prepared in rabbits by the intravenous injection of *Plasmodium knowlesi* antigens it was possible to obtain the reaction of complement fixation. The antigen for stimulating antibody formation in the rabbit was prepared by alternate freezing and thawing of a

suspension of heavily infected red blood corpuscles from a monkey or by exposing the infected red blood corpuscles to monkey red cell haemolysins prepared by injecting normal monkey red cells into rabbits on a number of occasions. While the freezing and thawing method left a certain amount of corpuscular material adherent to the parasites the haemolysin method removed all traces of red cells from the parasites which by washing and centrifuging could be obtained in a high degree of purity.

Antigens for the complement fixation test were prepared from saline extracts of the spleen or blood of monkeys during the end stages of an acute infection. With the serum of the immunized rabbits and the antigen it was possible to carry out the complement fixation reaction. In certain cases false positive reactions were obtained. These were due very largely to the presence of traces of blood cells in the antigen used for immunizing the rabbits.

The paper describes experiments with other antigens and discusses the estimation of the titre of the antiserum and other factors upon which a satisfactory complement fixation depends.

C M Wenyon

RODHAIN (J) & LASSMAN (P). Le cycle schizogonique de *Plasmodium schuetzi* et l'évolution de ce parasite chez *Anopheles maculipennis* var *atroparvus* [Schizogony Cycle of *P schuetzi* and Evolution of the Parasite in *A maculipennis* var *atroparvus*].—*Ann Soc Belge de Med Trop* 1940 June 30 Vol 20 No 2 pp 179-186 With 1 chart

In his previous observations on *Plasmodium schuetzi* of the chimpanzee the author had been able to determine the cycle as at least 36 hours. In the present paper the development of a good infection in a freshly inoculated chimpanzee has enabled him to make further observations. He has been able to follow at least three complete cycles and can now state that each is of 48 hours duration as had previously been claimed by REICHENOW who had also maintained that the parasite was identical with *P vivax* (which it closely resembles).

The author of the present paper also records his attempts to infect *Anopheles maculipennis* var *atroparvus*. In all 280 of these mosquitoes were allowed to feed on the chimpanzee whose blood contained both male and female gametocytes the former flagellating readily. Of the mosquitoes fed 107 were subsequently dissected. Oocysts were found in only three and two of these were mature and contained sporozoites. In no case was a salivary gland infection noted. A feature of the oocysts was their large size the two mature ones measuring 88.8μ by 72.8μ and 76.8μ by 63.6μ . This shows them to be larger than those of *P vivax* which have an average diameter of 48μ and do not exceed a measurement of 66μ by 58.5μ . It seems clear that *A maculipennis* is not a very satisfactory host for *P schuetzi* the oocysts of which on the basis of the admittedly meagre observations recorded in the paper are larger than those of *P vivax*.

C M Wenyon

TRYPANOSOMIASIS

RODHAIN (J) VALCKE (C) & VAN GOIDSENHOFEN (Ch) Considérations sur le diagnostic et la thérapeutique de la méningo-encéphalite trypanomique humaine d'après l'observation de quatre Européens atteints de la maladie du sommeil. Existence dans le sang et le liquide céphalo-rachidien des malades de sensibilités fixant le complément. [Diagnosis and Treatment of Trypanosomal Meningo-Encephalitis. Complement Fixing Substances in Blood and Cerebrospinal Fluid]—*Ann Soc Belge de Méd Trop* 1941 Sept 30 Vol 21 No 3 pp 195-220 [18 refs]

The first part of this paper comprises clinical notes on four cases of advanced nervous infection of Europeans by *T. gambiense*. Noteworthy features are —

(1) The slow evolution frequently noticed—actually eight years in one case before diagnosis.

(2) Success of the synergic treatment by repeated courses of Bayer 205—Tryparsamide and tartar emetic. The one case not apparently cured had previously been treated with M & B 800 [Pentamidine or 4:4 diamidino diphenoxy pentane] in Sierra Leone.

(3) The difficulty of diagnosis in the absence of trypanosomes in the cerebrospinal fluid, blood or gland juice. Colloidal tests of the cerebrospinal fluid do not distinguish from syphilis of the central nervous system as both give parietic type curves. Wott's morula cell favors trypanosomiasis.

The second part deals with efforts to estimate the value of a complement fixation test in the blood and cerebrospinal fluid using an antigen made from *T. equiperdum* as in the diagnosis of dourine.

(1) The blood of all three tested patients was positive.

(2) The cerebrospinal fluid of two was positive, the third equivocal.

(3) The cerebrospinal fluid became negative after treatment.

The possibility of the test being developed for diagnosis and as a criterion of cure is discussed. C. C. Chetman.

TRYPANOSOMIASIS

KOWALZI. Ueber Kala Azar Beobachtungen in Spanien. [Kala Azar in Spain]—*Deut Trop Ztschr* 1941 May 15 Vol 45 No 10 pp 302-307.

The author describes five cases of kala azar in German soldiers who were with the foreign legion in Spain during the civil war. It appeared that infection occurred during the summer of 1938, the first symptoms becoming evident during the succeeding winter. Four of the patients recovered under neostibosan treatment carried out in Spain. The fifth case, which was far advanced when diagnosis was made in Berlin, terminated fatally. C. M. Heaton.

DRENOWSKI (A K) Bemerkungen ueber Hundeleishmaniasis im
Distrikt Petritsch [Canine Leishmaniasis in the Petrich District]
—*Deut Trop Ztschr* 1941 Nov 15 Vol 45 No 22 pp
690-692

An examination of the blood serum of 100 dogs in the Petrich district of Bulgaria by the formal gel reaction has shown that 51 per cent are strongly positive 30 per cent positive and 19 per cent negative. In the strongly positive group the sera became opalescent and solid in 15 minutes while in the positive group this result was obtained in up to six hours. It is concluded from these results that canine leishmaniasis is widely spread in the district

C M Henson

BRAHMACHARI (Upendranath) & BASU (Charu Chandra) Ulcerating
Type of Dermal Leishmanoid with Pseudo Arthritis and Ichthyotic
Condition of the Skin — *Jl Trop Med & Hyg* 1942 June 1
Vol 45 No 11 pp 81-82 With 4 diagrams (1 coloured) on
2 plates

The case reported is that of an Indian who was admitted to hospital in Calcutta suffering from dermal leishmaniasis which developed two years after apparent cure of kala azar. The condition was unusual as in addition to cutaneous nodules there were ulcers between the eye brows on the upper lip and on the middle finger of the right hand. Leishmania were found in scrapings from the ulcers. There was extensive erythema of the face and an ichthyotic skin eruption over the chest and abdomen. The finger with the ulcer was swollen but though this appeared to be due to arthritis X ray examination revealed a normal joint. One course of urea stibamine brought about a disappearance of the skin lesions but relapse occurred. The skin lesions are again responding to a second course of the drug.

C M Henson

VAPIER (L Everard) SEN GUPTA (P C) & SEN (G N) The Treatment
of Kala Azar by Diamidino Stilbene Analysis of 101 Cases —
Indian Med Gaz 1942 June Vol 77 No 6 pp 321-338
With 8 figs [16 refs]

In this paper the authors give an account of their experience in the treatment of 100 cases of kala azar with stilbamidine (4 4 diamidino stilbene). The patients who were mostly Indians varied in age from under one year to over 45. They were in all stages of the disease which in about half was of over six months duration. In all but two typical cases the diagnosis was confirmed by discovery of the parasite in smears from spleen sternum or tibia puncture or by culture of the puncture material. Spleen puncture was the most reliable method. In 74 of the 100 cases the aldehyde test was positive. The drug was administered intravenously in a 1 per cent solution in distilled water in 95 of the cases. In the remaining five cases it was given intramuscularly but this proved to be very painful. Injections were given daily. In over 90 of the cases in which no previous treatment had been given 10 or 12 doses were given. In the others which were resistant cases up to 15 injections were given.

The dose finally adopted for adults was an initial dose of 0.025 gm followed by doses of 0.050, 0.060 to 0.075 according to reaction 0.090 and 0.100 gm up to a maximum of 1 mgm (0.001 gm) per pound of body weight. In small children the initial dose was 0.010 gm up to a slightly higher dose than 1 mgm per pound of body weight as children tolerated the drug better than adults. The mean total dose given in ordinary cases was 0.597 ± 0.245 gm while in resistant cases it was 0.884 ± 0.414 gm. Per 100 lb of body weight the mean total worked out at 0.912 ± 0.224 for ordinary cases and 1.009 ± 0.493 for resistant cases.

The reactions following administration of the drug are troublesome and sometimes alarming but apparently free from danger. About a quarter of the cases had severe reactions, half mild reactions while the remaining quarter were not wholly free from unpleasant sensations. After the injection of the drug the blood pressure nearly always showed a marked drop which was sometime very alarming. It was found that this could be controlled by giving an injection of 0.25 cc of 1 in 1,000 adrenalin just before the administration of the drug.

Of the patients treated 98 were cured and two died. Of the 98 two relapsed and of the one received a second course of the drug. After treatment the haemoglobin showed a 50 per cent increase while the leucocytes were below 4,000 in only 13 of the cases whereas they were below this level in 76 of the cases before treatment.

It is concluded that the introduction of stilbamidine has made a very great advance in the treatment of kala-azar. The results of treatment compare very favourably with those produced by neostibosan. Antimony resistant cases respond to the drug about as favourably as ordinary cases. Weight for weight only about a quarter as much stilbamidine is required per case as neostibosan. In a mixed population 60 gm should be sufficient to cure 100 patients or 90 gm to cure 100 patients of an average weight of 100 lb. The drug does not appear to be of any value in the treatment of dermal or cutaneous leishmaniasis.

C. M. Wenyon

HENRY (A. J.) & GRINDLEY (D. N.) Fluorescence and Adsorption of Stilbamidine and its Estimation in Biological Fluids—*Ann Trop Med & Parasit* 1942 Sept 30 Vol 36 No 3 pp 102-117

This investigation was carried out at Khartoum in order to study the fate of stilbamidine (4,4'-diamidino stilbene dihydro chloride) which is used in the Sudan for the treatment of kala-azar. As was reported by HAWKING and SMILES [*this B. Bulletin* 1942 Vol 39 p 238] stilbamidine is strongly fluorescent in ultraviolet light. The present authors found that it was also absorbed very tenaciously by filter paper, the spot on the paper showing bright fluorescence. This method can be used for estimation, the spot produced on the paper by a drop of the unknown solution being compared with spots produced by drop of known concentration. Alternatively a more orthodox chromatographic method may be used, the unknown fluid being percolated through a column of cellulose pulp, the stilbamidine is adsorbed in the upper layers of the column which are removed according to their fluorescence and subjected to the Kjeldahl process to estimate the nitrogen content of the adsorbed stilbamidine. The effect of many substances on the fluorescence of stilbamidine was studied. The

addition of oxalate causes a white precipitate and diminution of fluorescence citrate has no effect When solutions of stilbamidine are slowly added to normal saline a precipitate appears which redissolves on shaking this observation is relevant to the optimum rate for intravenous injection The stilbamidine is adsorbed on filter paper as the free base the hydrochloric acid being neutralized by mineral impurities present in the paper and it can be washed out again by acid

The technique of estimation is as follows —

A standard Dreyer pipette is used fitted at the top with a short piece of rubber tubing the end of which is closed with a glass rod and a screw clip By unscrewing and screwing the clip liquid is drawn into the pipette and then (the pipette being held vertical in a clamp) a drop is expelled on to a piece of filter paper placed horizontally 1 cm below the pipette No 50 paper is very suitable The drop is allowed to soak freely into the paper and is allowed to dry It is then compared under ultra violet illumination with spots prepared from a series of known concentrations When once a solution of stilbamidine whether in water or a biological fluid has been spotted out the fluorescence of the spot seems to be quite permanent at any rate for more than two months This allows a permanent record to be kept and examination under the lamp can be deferred until convenient [This permanence is surprising since solutions of stilbamidine show marked quenching of the fluorescence under continued ultra violet illumination presumably it is advisable to keep the papers dry and in the dark] It may be necessary to dilute the unknown fluid so as to bring it within the appropriate range i.e. less than 5 mgm per 100 cc in this case the dilution should be effected with the same fluid as that being examined e.g. urine should be diluted with urine The average error of this test is about 25 per cent

In certain cases such as highly coloured solutions and solutions with considerable solid matter in suspension it is necessary to wash the filter paper under the tap for about five minutes after the liquid has been absorbed in order to remove interfering colouring matter or suspended solid By this technique concentrations of 1 in 2 million can be detected in urine in spite of the presence of other substances which fluoresce Since the fluorescent spots obtained with stilbamidine dissolved in urine are somewhat different from those obtained with solutions in water it is necessary to prepare a series of standards dissolved in urine for the comparison If the urine is alkaline and consequently cloudy the test is not affected so long as the concentration of the compound is low and the suspended matter is not permitted to settle The urine should be well shaken before it is diluted or used for the test

The test is readily applicable to estimations in blood serum plasma or cerebrospinal fluid in milk the accuracy is less the lowest detectable concentration being 0.25 mgm per 100 cc A table (below) is given showing the urinary excretion of two men after each had received a single intravenous injection (apparently of 100 mgm) at 8.0 a.m.

It is seen that the rate of excretion in the urine rapidly falls and that after about 2½ days excretion becomes undetectable the total amount excreted is about 10 per cent of that injected

When stilbamidine is added to citrated blood about 85 per cent of the drug is adsorbed by the corpuscles and cannot be recovered by haemolysis or by various other methods It is probable that much

First subject			Second subject		
Time	Concentration of drug (mgm per 100 cc)	Total drug per sample (m ^m m)	Time	Concentration of drug (mgm per 100 cc)	Total drug per sample (m ^m m)
8.30	4	0.4	4.34		
10.00	5	3.75	9.50	3.5	4.5
11.30	0.7	0.85	1.15	1.8	1.7
	0.5		13.10	0.7	0.5
Remainder of first day	0.7		15.40	0.2	0.15
	0.6	3.6	18.40	0.2	0.2
	0.6				
	0.5				
Second day	0.4		5.34		
	0.3	2.0	9.30	0.15	0.5
	0.2		6.00	0.15	0.3
	0.2		9.00	0.1	0.1
Third day			11.50	0.1	0.2
	0.2	0.6	16.00	0.1	0.15
	Subt		19.00	0.08	0.05
	Negative				
	Total drug excreted	11.4 m ^m m	6.34		
			5.10	0.08	0.5
			11.40	0.06	0.1
			Not given	0.0	0.0
				Negative	
				Total drug excreted	8.9 m ^m m

of the compound which disappears after injection is adsorbed by the corpuscles in some form which is dissociated only very slowly.

[If stilbamidine is adsorbed by the red corpuscles it is probably in some non fluorescent form since the corpuscles of mice treated with stilbamidine do not show up in blood films examined by the fluorescence microscope.]

F. Harkin

CUPI (Nino) & CATTAPAN (Altino). Contributo allo studio del bottone d'Oriente nel Governo dell'Amara (Osservazioni cliniche). Clinical Observations on Oriental Sore in Amara Eritrea. — *Boll. d. Soc. Italiana di Med. e Ig. Trop.* (Sez. Eritrea) Amara 1942 Vol. 1 No. 2 pp. 19-24. English summary (8 lines).

In this paper are briefly described a number of cases of oriental sore which the authors encountered in the Amara province of Eritrea. For treatment FLAKER's method of local injections of a solution of atebrom was adopted. This gave satisfactory results both as regards the rapidity of cure and the inconspicuousness of the resulting scar.

C. M. H. 101

MARCHIONINI (Alfred) Die Behandlung der Orientbeule (Hautleishmaniose) [Treatment of Oriental Sore]—*Schweiz Med Woch* 1941 Oct 18 Vol 71 No 42 pp 1220-1223 With 4 figs [18 refs]

The author gives an account of his experience with oriental ore based on 300 cases treated by him in Ankara. Early typical cases in which leishmaniasis are demonstrable respond to local treatment by injection around or into the lesion of 1-2 cc of a 10-20 per cent solution of atabrin. The treatment may have to be repeated once or twice after intervals of 5 to 10 days. When multiple sores are present the atabrin is administered intravenously or better intramuscularly. The first dose is 0.1 gm and this is increased after two days to 0.2 gm and two days later to 0.3 gm. Two or three further injections of 0.3 gm are given. Atabrin treatment is effective in the early typical cases but fails to cure the many atypical chronic cases of which there are numerous varieties in which leishmaniasis cannot be found. For these a number of different treatments have to be tried including injections of antimony derivatives, local applications of rivanol or trypaflavin, mercury or bismuth ointment. In other cases electro-coagulation treatment or deep infiltration with Röntgen rays must be adopted. In some cases it was found that there was no response to treatment till a chronic malarial infection had been dealt with by administration of quinine. Similarly when there was concomitant lupus or syphilis the e infections had to be treated by their own appropriate remedies.

C. M. Wenzon

GARZON (Rafael) & MOLINA (Rodolfo J.) A proposito de un caso de leishmaniasis tegumentaria americana. Consideraciones clinicas diagnosticas y terapeuticas [A Case of American Mucocutaneous Leishmaniasis]—*Rev. Argentina de Dermatofisiologia* 1942 Vol 26 Pt 2 pp 225-247 With 8 figs [29 refs]

The authors describe in detail a case of mucocutaneous leishmaniasis which was under treatment in the Hospital San Roque Tucuman in N Argentina. The patient was an Italian 43 years of age whose illness commenced with an insect bite on the left foot. Later a lesion appeared on the ear while the rhino-pharyngeal mucosa became involved. The clinical and pathological features of the case are recorded and illustrated by a series of photographs. Treatment with intravenous tartar emetic brought about considerable improvement, the ulcers showing signs of healing from the periphery towards the centre.

C. M. Wenzon

FEVERS OF THE TYPHUS GROUP

SONNENSCHN (S.) Das Fleckfieber als Kriegsseuche [Typhus in Wartime] [Abstract of paper read at Prague on 13th Feb 1942]—*Deut Med Woch* 1942 Aug 7 Vol 68 No 32 p 808

At this meeting Sonnenschein gave the following figures of the incidence of typhus. It will be noted that in general they do not

greatly differ from those quoted from American sources in this Bulletin
1942 Vol 39 p 655

	1940		1941	
	Cases	Deaths	Cases	Deaths
Germany	556	9	1 969	376
Rumania	969		1 686	20
Hungary	83		699	14
Bulgaria	13	14	194	15
Yugoslavia	195	18	164	
Greece	30	1		939
Spain	7 900	5.6 per cent	5 86	
Poland (German-occupied)				

C II

LEAGUE OF NATIONS HEALTH SECTION WEEKLY EPIDEMIOLOGICAL
RECORD 1942 Sept 24 Vol 17 No 39 (R.H. 865) p 270
Typhus in Germany

According to Communiqué No 721 from the Office International
d'Hygiène Publique Paris there were 1 270 cases of typhus reported
from Germany between April 5th and July 4th 1942 distributed as
follows—

Prussia 672 Bavaria 157 Saxony 41 Württemberg 71
Baden 13 Hamburg 110 Thuringia 22 Heide 10 Mecklen-
burg 1 Brunswick 1 Oldenburg 2 Bremen 6 Anhalt 13
Schaumburg Lippe 1 Lower Danube 1 Upper Danube 11
Carinthia 3 Styria 35 Vienna 45 Sudetenland 19

PRIMITIVO DE LA QUINTANA Das Fleckfieber in Spanien (Typhus)
Fever in Spain —Zentralblatt für Bakteriologie 1942 May 16
Vol 123 No 6 pp 665-674 With 6 figs

From 1901 to 1922 typhus fever was relatively common in Madrid
and some of the south-eastern provinces of Spain. The highest peaks
were—1904 (400 deaths) 1909 (671 deaths) 1913 (243 deaths) and 1919
(227 deaths). From 1922 to 1938 there were never more than 16
deaths in any year. Madrid has always been the chief focus of infection.

During the civil war Spain was remarkably free from typhus fever
but immediately after the end of the war early in 1939 cases began to
occur in the south-eastern provinces. Early in 1940 fairly severe
epidemics occurred in Granada and Seville at the end of the same
year there were fresh outbreaks in Murcia and Almería. In January
1941 Madrid and several south-eastern provinces were affected as well
as a few other parts of Spain. Altogether in 1941 about 7 000 cases
were reported in Spain with a case-mortality rate of 13 per cent. There
were 2 266 cases in the city and province of Madrid. In the city the
disease suddenly flared up towards the end of March and rapidly
reached the peak of 154 cases weekly by the middle of April. It
declined to a weekly rate of 50 to 60 cases in May and June and from

about the middle of August there were less than 10 cases weekly. The chief features of the age distribution were the rarity of cases under the age of five and the very low case fatality rate under the age of 25.

Systematic measures of prevention were only possible in Madrid and even there great difficulties were encountered owing to malnutrition, poverty, movements of population and depletion of the medical and sanitary personnel.

Various vaccines were tried. Lagret's live attenuated murine vaccine was ineffective. In one prison 300 persons were vaccinated but there were 25 attacks and two deaths. Cox's egg yolk vaccine could not be satisfactorily tested but there was evidence that it greatly reduced the severity of the disease in workers at a research institute who suffered from attacks resulting from laboratory infection. Durand and Giroud's rabbit lung vaccine also was not fully tested but at any rate it was quite harmless. A good impression was created by a vaccine received from Prof Otto of Frankfurt on Maine (see below p 129). 200 doses were given to members of a staff specially exposed to risk and no attacks followed but as the epidemic was coming to a close no definite conclusions could be drawn. *John W D Megaw*

CASTANEDA (M Ruiz) Alrededor del problema etiologico del tifo exantematico [The Aetiological Problem of Exanthematic Typhus]—*Diario Medico* Buenos Aires 1942 June 22 Vol 14 No 25 pp 559-565 [45 refs.]

This is a general review of the problem with special reference to Mexico and the rest of the American continent. Its chief interest lies in the opinions expressed by a worker who has been engaged for more than 10 years on intensive research in the subject.

The author believes that a systematic investigation would undoubtedly show murine typhus to be present in mild form throughout Mexico. He recommends the use of rapid bedside modifications of the Weil-Felix test as the best means of obtaining information on this subject.

Reference is made to the pinareno typhus of Cuba, the Rickettsia of which protects against murine typhus but causes neither febrile nor serological reactions in guinea-pigs. It is transmissible through these animals for only a limited series of passages. Clinically the disease is related to the mild typhus of the tropical parts of Mexico.

Probably there is a whole gamut of types of Rickettsiae varying with the climatic conditions and showing every intermediate stage between the typically murine and the typically classical forms.

The early work of Castaneda, ZINSSER and others suggested that the murine strain did not protect against classical typhus but later research showed that the richer vaccine prepared from rat and mouse lungs was fully protective. This rich vaccine has been shown to be effective against the Bolivian house-borne typhus in human beings.

No clinical distinction exists between murine and classical typhus. Both orchitic and non orchitic strains of Rickettsiae may cause mild or severe attacks. The striking differences in the animal reactions caused by these can be explained on the hypothesis that murine strains become modified after a number of passages through human beings. Comparable modifications are known to occur in the viruses of rabies and yellow fever in which also the immunizing properties of the virus are not altered by the fall in virulence. The author reports

that he and HUDON have now prepared from horses infected with a murine strain a serum which is about 16 times more potent than convalescent human serum. The immunological differences between murine and classical strains of *Rickettsiae* become less and less evident with the continued improvement in the method of testing cross immunity: the murine strain is preferable because it lends itself more readily to the preparation of vaccines.

Castaneda proposes the following classification of the human Rickettsial fever, but he makes no mention of trench fever.

(1) The Rocky Mountain fever type including Sao Paulo typhus, Tobia typhus and boutonneuse fever.

(2) Exanthematic typhus including murine typhus, tabardillo, Manchurian typhus, atypical murine typhus, classical or European typhus and Brill disease.

(3) Tsutsugamushi, Japanese and Malayan.

(4) The Q fever of Queensland and America.

The immunological relationships between the fevers of these different groups are held to be much closer than is generally believed. For example, PARKER in 1933 isolated from a tick a strain which immunized guinea pig against typhus fever as well as against Rocky Mountain spotted fever and Castaneda himself has found that a Rocky Mountain strain which caused a fatality rate of 90 per cent in normal guinea pig killed only 20 per cent of guinea pig which had recovered from either murine or classical typhus fever. He also found that after passing the Rocky Mountain strain from one immunized guinea pig to another by successive inoculations it gradually lost its virulence for the immunized animals, but when the strain was again transferred to normal animals it was as deadly as before. Comparable results were obtained when guinea pig immune to Rocky Mountain fever were inoculated with *Rickettsiae* of classical typhus. It will be interesting to investigate the question whether the same close immunological relationship exists between the other groups of Rickettsial diseases.

In summing up the author affirms the aetiological unity of the various forms of exanthematic typhus including flea-borne typhus.

A bibliography is appended in which 45 references are given to articles dealing with the problem, all but four of these have appeared in North and South American journals and most of them have already been abstracted in this *Bulletin*.

[The author appears to be a firm believer in the essential unity of louse-borne, flea-borne, tick-borne and mite-borne Rickettsial fevers excepting trench fever which is not discussed, but like most Americans he avoids the use of the name typhus for the tick-borne and mite-borne fevers.]

John H. D. Meade

CASTANEDA (M. Ruiz). Bivalent Typhus Vaccine of High Immunizing Value.—*Science* 1942, Sept. 25, Vol. 96, No. 2491, p. 304.

The author states that vaccines of epidemic typhus strains have little protective value against infection with murine strains, but that by increasing the antigenic content of the murine vaccine it is possible to immunize against both murine and epidemic typhus. The cultivation of murine *Rickettsiae* in the lungs of rats gives larger amounts than are possible with the epidemic Breml strain, but a Mexican epidemic strain has been found which grows well in the lungs of mice and which has a high protective value. Vaccines from the mouse lung

epidemic strain and from rat lung murine strains when mixed constitute the bivalent vaccine the antigenic composition can be altered at will. The final concentration for human use has a turbidity between 1 and 2 on the McFarland scale the doses are 0.5 cc 1.0 cc 1.0 cc at weekly intervals but for laboratory workers five doses should be given.

In a field trial of immunization with a murine strain alone in Mexico it was found that cases of typhus occurred after the inoculations had been completed thus led the author to suspect that cross protection between murine vaccine and some epidemic strains was insufficient and caused him to consider the addition of epidemic antigen as described above. C II

OTTO (R) & BICKHARDT (R) Weitere experimentelle Untersuchungen ueber Schutzimpfstoffe gegen Flecktyphus. Impfstoffe aus rickettsienhaltigen Mauslungen [Further Experimental Investigations into Protective Vaccines against Typhus Fever].—*Ztschr f Hyg u Infektionskr* 1942 May 16 Vol 123 No 6 pp 717-724 With 2 figs [13 refs]

Guineapigs were used in carrying out rather severe tests of the efficacy of several types of killed vaccines. The number of animals used in testing each kind of vaccine is given in brackets. The vaccines were—mouse lung (11) and fowl yolk sac (22) vaccines made at the Institute at Frankfurt. Giroud's rabbit lung vaccine (4) a vaccine made from the embryonic tissues and yolk sacs of developing chicks (3) and Cox's original yolk sac vaccine (13). Altogether 29 control guineapigs were used. The vaccine made from combined embryonic tissue and yolk sacs had little protective value a vaccine of this type described as Otto and Wohlrab vaccine has already been reported by Mrugowsky as being of doubtful value for human beings. All the other types gave a good degree of protection to the experimental animals. Technical details are given of the method employed in preparing the mouse lung vaccine. A rich suspension of *Rickettsia prowazekii* was first obtained from yolk sacs of developing chick embryos this was inoculated under anaesthesia by the nasal route into white mice. After repeated lung passages in the mice a fatal massive pneumonitis resulted regularly from the inoculation and smears of the lungs contained large numbers of *Rickettsiae*. Suspensions of the triturated lungs were made in normal saline containing 0.5 per cent phenol. Each mouse yielded 10 to 15 cc of vaccine of which the total dose for human beings was 2 cc given in doses of 0.5 0.5 and 1.0 cc at five-day intervals. In some cases half of these doses was given to guineapigs in others full doses at the same intervals. Three to four weeks later each of the inoculated animals and controls was given an intraperitoneal injection of a passage strain of *R. prowazekii* containing 1-200 of the brain of a guineapig killed on the third day of fever. This large dose regularly caused a typical attack of fever in the control animals after a seven to eight day incubation period.

The authors had no personal experience of the value of the vaccine in human beings but on the strength of their animal experiments they are now issuing mouse lung vaccine in addition to the yolk sac preparation. Reports suggest that the mouse lung vaccine causes even milder local and general reactions in man than yolk sac vaccines.

The relatively poor results from the combined embryonic tissue and yolk-sac vaccines are believed to be due to the poverty of the embryonic tissues in Rickettsiae.

The investigation described in this paper was carried out at the State Institute for Experimental Therapy and Chemo-therapeutic Research at Frankfurt-on-Main which is one of the chief sources of supply of anti-typhoid vaccine in Germany. The report confirms existing impression that egg yolk and animal lung vaccines are likely to give some degree of protection to human beings and that no final verdict can yet be given as to which of the two types of vaccine is the better.

John H. D. Macrae

McKENZIE (Melbourne, D.) The Louse in Relation to Typhus Fever—J. R. San. J. 1942, Oct. Vol. 6, No. 4, pp. 177-181.

KLUMBERT (H.) & BUCH (E.) Erfahrungen mit der Weil Felix Reaktion [Experiences with the Weil Felix Reaction]—Ztschr. f. Immunitätsforsch. Exp. Therap. 1941, 20, Vol. 102, No. 2, pp. 133-152.

The authors have taken full advantage of the abundant opportunities now available to German workers for investigating the potentialities and limitations of the Weil Felix test. They regard the test as being based on a genuine and indisputable anamnestic reaction whose value in the diagnosis of typhus fever is indubitable.

Most observers in endemic areas regard a titre of 1-200 as a diagnostic one of 1-100 as suggestive and one of 1-50 as negative when readings are made after 1 to 2 hours at 37°C. Lot titres up to 1-50 are often found in persons living in endemic localities and these titres are frequently increased in cases of typhoid, paratyphoid, undulant fever, tuberculous dysentery and trachoma, probably also in other infections such as pneumonia and influenza. In the same way the Weil reaction may become positive in cases of typhus fever even when the patient has never had typhoid fever so that practical difficulties arise in the differential diagnosis between typhus and typhoid.

As has already been shown by Felix the titre of the anamnestic Weil Felix reactions seen in cases of typhoid fever does not continue to rise after the first week whereas the Weil reaction which at first is often negative becomes positive in the following 1 to 2 weeks.

In the present experiment three different strains of *Proteus OX19* were used: (1) the Frankfurt strain, (2) a mixture of the old and new Warshaw strain, and (3) a mixture of the old and new Cracon strain. Differences occurred in the titres of agglutination observed with these three strains when used in testing the same sera but only in a few cases were these differences pronounced.

Sera of 45 healthy persons living in typhus-free areas were tested 10 of these gave positive reaction against one or more of the three strains of OX19 but only in titres of 1-25.

Sera of 211 German immigrants from Bessarabia (a rural endemic area) to Litzmannstadt (an urban endemic area) were tested. In one group of 40 of these three had titres of 1-100 or over and 12 had titres of 1-50 against one or more of the strains of OX19. In another group of 77 of these persons four had titres of 1-100 or over 27 had titres of 1-50 and 16 titres of 1-25. In this group three had positive Weil reactions 1-100 and three 1-50 one agglutinated the Flexner

bacillus 1-200 four at a titre of 1-100 and 12 at 1-50 only three agglutinated the Shiga bacillus and that at a titre of 1-25 The other groups gave very similar types of response Derling only with the Weil Felix reactions no less than 110 (52 per cent) of the 211 sera agglutinated OX19 in 102 cases the titre was 1-25 to 1-50 in the remaining eight it was 1-100 or over against one or more of the three strains

Sera of the Polish inhabitants of Litzmannstadt were tested 222 (73.9 per cent) were positive to *Proteus* OX19 at titres of 1-25 or over From these sera 161 were selected as coming from persons with completely negative histories of typhus typhoid and dysentery the readings were made after 20 hours at room temperature and so reacted in higher titres than would have been observed if the reading had been made after two hours The following results were obtained —

Positive against <i>Proteus</i> OX19 only	
OX19 and typhoid	22
OX19 and Shiga	1
OX19 and Flexner	7
OX19 Shiga and Flexner	42
OX19 typhoid and Flexner	56
OX19 typhoid and Shiga	10
OX19 Shiga Flexner and typhoid	7
	16

Most of the readings ranged between 1-25 and 1-200 The findings suggested to the authors that in the presence of co-agglutinins Weil Felix titres below 1-200 were hardly reliable Sera of 191 persons with strongly positive Wassermann reactions were tested 164 of these agglutinated *Proteus* OX19 at varying titres five of them at a titre of 1-400 although there was no history of attacks of typhus

During the investigation of typhus fever at Litzmannstadt 5483 patients known or suspected to be suffering from typhus were tested with the following results — 1062 gave positive reactions for typhus only 1074 reacted to typhoid only and 1041 to both typhus and typhoid In the group of 1062 patients whose sera reacted only to *Proteus* OX19 bacilli of the typhoid group were cultured from the blood of 132 in 107 of these cases the Weil Felix reaction was positive in titres ranging from 1-200 to 1-1600 In the group of 1074 who reacted only to typhoid positive blood cultures of typhoid organisms were obtained in 168 including 48 cases in which the Widal titres were as low as 1-50 to 1-100

A table is given of the cases in which both the Widal and Weil Felix reactions were positive the examples below show the general trend of the findings but the days of the disease on which the blood examinations were made are not stated

A group of 191 persons with strongly positive Wassermann reactions was examined no less than 164 of these agglutinated *Proteus* OX19 but the titres are not stated

The frequent occurrence of agglutination of typhoid and dysentery bacilli by the sera of persons who give positive Weil Felix reactions points to anamnestic increases in the agglutinin owing to previous infections by the organisms concerned so also it is necessary to take into account the occurrence of anamnestic reactions to *Proteus* OX19 resulting from previous attacks of typhus fever When anamnestic reactions can be excluded Weil Felix titres of 1-200 are diagnostic

Number of cases	Titre of Agglutination		Typhoid bacilli cultured from the blood
	<i>Pro-cus OX19</i>	Typhoid	
135	1-50	1-50	6
165	1-50	1-100	24
127	1-50	1-200	25
63	1-100	1-100	-
66	1-100	1-400	18
20	1-200	1-100	2
23	1-200	1-100	4
1	1-200	1-800	-
35	1-800 or more	Varying titres	2

In one of these the Widal was positive 1-100 in the other the Weil Felix titre was 1-6400 and the Widal 1-25 presumably both cases were mixed infections but the authors hold that Weil Felix titres as high as 1-400 may be non specific and that Widal reactions in the same high titre may also be non specific.

and titres of 1-100 are suggestive of typhus. Repeated tests are the best means of excluding the fallacies due to anamnestic reactions.

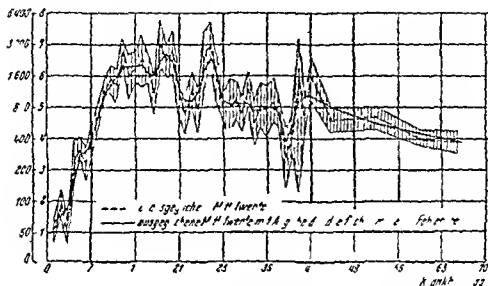
John W. D. McArthur

SCHUTZ (F) & MESSERSCHMIDT (T) Eintritt und Verlauf der Weil Felix Reaktion während der ersten 10 Krankheitswochen beim Fleckfieber [The Onset and Progress of the Weil Felix Reaction during the First Ten Weeks in Typhus Fever]—*Archiv für Protistenkunde* 1942 Aug 29 Vol 21 No 35 pp 772-773 With 2 figs

An interesting survey of the rise and fall of the Weil Felix titre in typhus fever has been prepared by analysing 987 observations on a large but unspecified number of patients. In most of the cases four or five observations were made but sometimes as many as 20 tests were carried out at intervals up to 70 days from the onset. Cases in which the titre was less than 1-200 were excluded.

One curve shows the percentage of cases in which titres of 1-200 or over were first observed. The curve shows a very rapid rise in the percentage of positives up to about the 10th day, then the curve rises less steeply and reaches its peak about the middle of the 3rd week thereafter it falls slowly but remains at a high level till the end of the 10th week. On the 3rd day 30 per cent were positive 1-200 or over on the 4th day 48 per cent on the 5th day 59 per cent on the 6th day 60 per cent on the 7th day 65 per cent in the 2nd week the percentage of positives rose to 91 per cent and in the 3rd week to 99 per cent. A curve on the same lines but based on titres of 1-400 or over followed the same general course but naturally at a rather lower level.

In another curve the average titre of the reaction at various stages is shown. Between the 3rd and 4th days this was 1-100 between the 4th and 5th day it was 1-200 by the 7th day 1-400 by the 11th day 1-1600 after the 11th day there was a slight further rise till the middle of the 3rd week when a gradual but very irregular fall began and continued till the end of the period of observation. Between the



Average titre of the Weil-Felix reaction during the first 10 weeks in Typhus Fever (987 observations)

— unweighted mean
— weighted mean (with \pm three times the standard error)

[Reproduced from the *Klinische Wochenschrift*]

3rd and 7th week there were very pronounced ups and downs in the titre not only in many individual cases but also in the smoothed curve showing the average titres on each day of the disease. The absence of information as to the number of observations on which each part of the curve is based detracts from the value of the graph but the unexplained irregularities that occurred in many individual cases are well shown by twelve examples which according to the authors could be multiplied indefinitely. Two samples are as follows: the figures in brackets give the day of the disease; the accompanying figures show the titres of agglutination —

I (10) 400 (14) 25 600 (20) 3 200 (23) 3 200 (32) 6 400
(41) 12 800 (45) 1 600 (49) 12 800 (62) 1 600

II (10) 1 600 (13) 25 600 (23) 6 400 (27) 3 200 (30) 3 200
(35) 12 800 (42) 1 600 (50) 6 400 (71) 800

John W. D. Megaw

TIETZ & CARLÉ Fleckfieber Schnellreaktion mit Trocken diagnosticum
Krakau [A Rapid Typhus Reaction with the Dry Diagnostic
Reagent Cracow] — *Deut. Militarärz.* 1942 June Vol 7
No 6 pp 399-400

A dry substance containing *Proteus OX19* is supplied in ampoules by the Cracow Institute for Typhus Research [The method of preparation is not disclosed so that the only point in which the test is really novel remains a secret]. The ampoules are labelled Fleckfieber Trocken Diagnosticum *Proteus OX19*. Each ampoule contains enough material for 20 tests for use its contents are thoroughly mixed with vigorous shaking in 2 cc of a sterile solution of saline to which an

unspecified quantity of sodium citrate has been added to prevent clotting. A drop of blood such as is used for making a thick film is placed on a glass slide and a drop of the diagnostic suspension is mixed with it. In positive reactions the bacteria form clumps and the blood corpuscles run together. If no clumping occurs within three minutes the reaction is regarded as negative. Immediate clumping is the equivalent of a Weil-Felix reaction in a titre of 1-3 200 or over. Clumping within one minute corresponds to a titre of 1-1 600 within two minutes to 1-800 and within three minutes to 1-400.

It is claimed that the reaction has been worked out so as to eliminate the false positives that may occur in epidemic hepatitis, enteric fever and brucellosis. The authors themselves have encountered a considerable number of false positive Weil-Felix reactions in trench fever as well as in epidemic hepatitis.

The authors explain that they were not aware of the work on similar lines that had been carried out by HALLIDAY [this Bulletin 1942 Vol 39 p 678] till after the delivery of the lecture (25 4 42) in which they described their method.

[Killed *Proteus* O19 in suspension in which alcohol has been added are said to keep for several months and therefore ought to be quite suitable for use in the field conditions for which the present test is claimed to be the only practicable method of diagnosis.]

John W. D. Macfarlane

BARTH (Constantin) Beitrag zur Frage des Bac. *Proteus* X19 beim experimentellen Fleckfieber. I. Mitteilung. [A Contribution to the Study of *Proteus* X19 in Experimental Typhus Fever].—*Ztschr f. Immunitäts u. Experim. Therap.* 1942 June 1 Vol 101 No 6 pp 397-404 10 refs.

Proteus X19 was cultivated on a medium to which the blood of a typhus patient was added by repeated subcultures in this medium a modified strain called *Proteus* X19B was produced. A group of guinea-pigs were inoculated first with cultures killed at 60°C and then with live cultures given by the intraperitoneal route. Ten days after the second injection the Weil-Felix test was carried out on samples of the heart blood. The animals reacted to ordinary strains of *Proteus* X19 in titres of 1-100 to 1-200 and to the strains of *Proteus* X19B in titres of 1-500 to 1-1 000. Higher titres were observed in the B strain which had been culture-passaged 50 times than in those culture-passaged 25 times.

Guinea-pigs which had recovered from attacks of experimental typhus fever gave the usual negative or lightly positive reactions to ordinary strains of *Pr* X19 but they reacted in titres of 1-100 to 1-200 or more to strains of *Pr* X19B which had been passaged 50 times. Control guinea-pigs were entirely negative to both strains.

Sera of persons convalescent from typhus agglutinated *Pr* X19B in higher titres than *Pr* O19. *Pr* HX19 or *Pr* X19. As in the previous experiments the B strains passaged 50 times reacted in higher titres than those passaged 25 times.

Guinea-pigs inoculated with vaccines made from cultures of *Pr* X19B of the 25th culture-passage were not protected against virulent strains of typhus Rickettsiae but animals inoculated with *Pr* X19B of the 50th passage developed a considerable degree of immunity as was

shown by the absence of significant reactions in about 77 per cent of the animals tested whereas all the control animals reacted in the typical way

These findings suggest the possibility of working out a method for the protective inoculation of human beings on a large scale. It is thought that immunity or at any rate premonition could be maintained without incurring the risk of introducing typhus virus into an uninfected community

John H. D. Megraw

PIERRO LUZZI (Giovanni) Studio sulla malattia di Leo Burger in Eritrea [A Study of Leo Burgher's Disease in Eritrea, —*Boll. d. Soc. Italiana di Med. e Igiene Trop. (Sez. Eritrea)*, Asmara 1942 Vol 1 No 1 pp 5-20 With 1 fig. English summary]

[A paper read at the first session of the Eritrean Section of the Italian Society of Tropical Medicine and Hygiene.] The paper deals with the disease variously called thromboangitis obliterans, juvenile endarteritis obliterans and Burgher's disease. The author saw no less than 20 cases within three years in Asmara. All the patients were European males between the ages of 27 and 46; no cases were seen in the indigenous population. The course of the disease corresponded with the descriptions of cases seen in Europe where the condition is specially common in Russia and other countries in eastern Europe. The attack begins as a thrombophlebitis nodularis migrans and eventually goes on to a condition of thrombotic occlusion of the veins and arteries of the affected parts. The clinical and pathological findings suggest an infective agency as the cause and a relationship with the vascular lesions of typhus was suspected. Accordingly the Weil-Felix test was performed in seven cases; in three the reaction was positive up to a titre of 1-320 in two and 1-1280 in the third.

There was no history of antecedent typhus in any of the cases. Each of the three reacting patients was given three doses of Weigl's original vaccine at weekly intervals. In two there was no reaction but the other patient who had reacted at a titre of 1-320 had a sharp exacerbation of his symptoms after the first dose and progressively diminishing reactions after the second and third doses. Within 15 days of the last injection the disease was arrested and apart from the permanent damage already done the patient remained free from further trouble up to the date of writing six months later. After the third dose the Weil-Felix titre fell sharply to 1-40.

The author concluded that the disease was caused either by the virus of European typhus or perhaps more likely by a related virus and that the response to treatment with Weigl's vaccine in an early case was very satisfactory. The cases in which the vaccine failed were already far advanced. Attempts to isolate the virus from the patients failed.

In the discussion following the reading of the paper Prof. DE FRANCESCO contested the author's claim to have shown that the virus was that of typhus fever and Prof. F. PLACEO showed a patient aged 30 in whom the same disease had been completely arrested for 14 months after the subcutaneous transplantation of the ovary of a young woman.

[The point that stands out is the high degree of prevalence of the disease in relatively youthful European males in Eritrea. It would be interesting to know whether the disease is common in other tropical countries.]

John H. D. Megraw

MENDOZA (Lazaro) Tifus exantematico en El Salvador Primeros casos diagnosticados y primera reaccion de Weil Felix positiva en el pais. [Exanthematic Typhus (Probably Murine) in Salvador The First Cases Diagnosed and the First Positive Weil-Felix Reactions in the Country]—*Paginas Clinicas* 1942 pp 93-103 Un ciudad de El Salvador

In October and November 1937 four cases of typhus like fever were seen. In one the Weil Felix reaction was negative in another it was full positive in a dilution of 1-80 having been negative in the early stages of the disease. In each of the two remaining cases there was a doubtful positive reaction in a dilution of 1-100 on one occasion this was preceded and followed by a completely negative reaction. The cases were purely sporadic no lice were found but two of the patients lived in rat infested houses. The disease was regarded as having been transmitted from rats by their fleas.

John W D McFar

MENDOZA (Lazaro) Tifus exantematico en el Salvador Caso con Weil Felix al 1-500 con Proteus O119 recién observado [Exanthematic Typhus in Salvador A Case with Weil Felix Reaction 1-500 with *Proteus* O119]—*Paginas Clinicas* Un ciudad de El Salvador 1942 pp 107-110

This is an addendum to the paper reviewed above. The case occurred in the month of August and was similar in its clinical aspects to the four already described. The serum of the patient agglutinated *Proteus* O119 in a dilution of 1-500 five days after a titre of 1-100 had been observed. In a footnote a still later case is mentioned in which the titre of the reaction was 1-1,500.

Head lice were collected from the patient towards the end of the attack and after trituration were inoculated by the intraperitoneal route into guinea pigs whose blood was later injected into three rats all of which died. One of the rats had an orchitic reaction. In one smear out of 25 made from the lice *Rickettsia* like bodies were found.

John W D McFar

DE ALGALHAES (Ota) & ROCH (Adri) Saneabilidade do Histiocitose (J. Geoffroy) ao tifo exantematico do Brasil. [Susceptibility of *Histiocitose* to Typhus]—*Brazil Medico* 1942 Mar 2 Vol 36 No 18 pp 233-236

KEPNER (Hermann) Ueber verschiedene Verlaufformen des Wolhynischen Fiebers. The Various Types of Wolhynian Fever (Trench Fever) —*Deut Med Woch* 1942 Aug 14 Vol 68 No 33 pp S14-S17 With 8 figs

Thus like the two recent articles by JACOPI and SYLLA [this Bulletin 1942 Vol 39 p 758 and 1943 Vol 40 p 38] deals specially with the clinical features of trench fever.

More than 150 cases were observed but no mention is made of the place of occurrence or of the epidemiological conditions in which the outbreak occurred. Great emphasis is laid on the protean nature of the disease and brief descriptions with temperature charts of several cases are given to illustrate this point.

The typical form of the disease with short paroxysms of fever recurring at intervals of four to seven days was often seen but was by no

means the predominant type. In many cases the symptoms preceded the onset of the fever by periods varying from a few days to three weeks. In this pre febrile stage slight rises in the rectal temperature could often be detected these tended to come in waves the pains also tended to come and go. In other cases the fever at first was of the continued type and then became typically paroxysmal. These cases in the early stages closely resembled typhus. Sometimes the temperature curve was quite irregular.

The spleen was palpable in about 50 per cent of the cases but the enlargement often lasted for a few days only. The blood picture in the early stage was not helpful in differential diagnosis. Later there was usually a pronounced leucocytosis during the febrile paroxysms total counts of 20 000 or more were sometimes observed. In the non febrile periods the leucocytes were considerably fewer. There was always a pronounced deviation to the left with an increase in the lymphocytes and monocytes. Eosinophiles were often absent in the paroxysms but were increased in the intervals. The pains in the early stages occurred in various parts of the body but later they tended to be localized in the bones especially the shin bones. In many cases the shin bone pains were entirely absent. The nerves were usually tender on pressure but there was no tenderness of the joints bones or muscles active and passive movements did not cause an increase in the pains. Altogether the character of the pains pointed strongly to the occurrence of an actual neuritis. A mild form of nephritis often occurred. Convalescence was sometimes rapid but in many cases weakness giddiness and loss of weight persisted for several weeks. Antineuralgic drugs were needed and convalescent serum seemed to be decidedly helpful in some cases but no dogmatic opinion could be expressed about its value. Sulphonamides quinine atabrin and salvarsan were quite useless.

[The author like the other German physicians who have had recent experience of the disease is obviously surprised by the great variations that occur in the manifestations of trench fever. Perhaps the name five day fever has been partly responsible for the mistaken impression that a regular feature of the disease is a relapsing fever with a five day periodicity. The shin bone pains also seem to have been regarded as being of almost universal occurrence. The types of the disease referred to in this paper have all been described by British observers on the western front in the war of 1914-1918.]

German physicians have now ample opportunities for clearing up the doubtful points connected with the disease. A specific diagnostic test is badly needed and the recent work on other Rickettsiae suggests that an agglutination test or a complement fixation reaction might be very helpful in diagnosis.]

John W. D. Meqau

BARTONELLOSIS

Howe (Calderón) Demostracion de aglutininas para la *Bartonella bacilliformis* [Demonstration of Agglutinins for *Bartonella bacilliformis*].—*Actualidad Med Peruana* 1942 Apr Vol 7 No 12 pp 348-356 [10 refs]

Emulsions of *Bartonella bacilliformis* suitable for agglutination tests have not hitherto been available but the difficulties have been

overcome by using the special culture media devised by GEIMAN [this Bulletin 1941 Vol 38 p 695]

The sera of normal rabbits in dilution of 1-10 gave negative reaction but after 12 to 15 intravenous inoculations with suspensions of the organisms over periods of 50 to 60 days responses of at least 2+ in titres of 1-160 were obtained. One animal responded 3+ in a titre of 1-640 five days after the last of 15 injections.

The sera of 15 persons suffering from or cured of Bartonellosis were then tested. Cases 1 and 5 had pronounced verrucose lesions, cases 2 and 3 had even attacks of Oroya fever, case 4 had recovered two months previously from a mild attack of verruga peruana and case 6 had an attack of verruga 30 years previously in childhood.

The reactions of the same persons were tested for agglutinins of three *Proteus* organisms. The responses are shown in the table. Although *B. bacilliformis* was agglutinated in low titres the reactions are regarded as significant. The reactions to the *Proteus* organisms are all regarded as significant though some of them fall within normal limits and some of the persons may have had previous attacks of typhus fever.

Sera of the rabbits which were immunized against *B. bacilliformis* were consistently negative to all the *Proteus* strains.

Agglutination reactions of persons suffering from or cured of Bartonellosis

	<i>B. bacilliformis</i>			<i>Proteus</i> OY19			<i>Proteus</i> OYK			<i>Proteus</i> OY		
	1	2	3	4	5	6	7	8	9	10	11	12
1 Verrucose lesions	+	+	±	4+	3+	2+	2+	-	-	2+	+	-
2 Oroya f.	2+	2+	-	2+	1+	-	-	-	-	+	+	-
3 Oroya f.	-	±	-	+	-	-	±	-	-	+	-	-
4 Cured case (recent)	-	-	-	-	-	-	+	-	-	-	-	-
5 Verrucose lesions	2+	+	±	3+	3+	+	+	+	-	3+	2+	+
6 Cured case (Old)	-	±	-	-	-	-	2+	-	-	-	-	-
Normal controls	-	-	-	-	-	-	-	-	-	+	-	-

John W. D. Meaurio

PLAGUE

GIRARD (G) Sur quelques nouveaux caractères différenciant les bacilles de la peste et de la pseudotuberculose des *Pasteurella* [New Characters Differentiating Plague and Pseudotuberculosis Bacilli from *Pasteurella*]—*Ann Inst Pasteur* 1942 Sept-Oct Vol 68 Nos 9-10 pp 476-478

French authors have not subscribed to the identification of the organisms of plague and pseudotuberculosis with human *Pasteurella* as it was put forward by LIGNIÈRES in his memoir on the haemorrhagic septicaemias. TRUCHE DUJARDIN BEAUMETZ and LÉVY BRUHL have set out the characters of differentiation. In the present article Girard advances still further arguments in support of this thesis—(1) The bacilli of plague and pseudotuberculosis grow normally in yeast water and in potato water which are not suited to the growth of *Pasteurella*. (2) No flocculation occurs on mixing an antiplague filtrate serum with *Pasteurella* culture and (3) The antiplague and anti-pseudotuberculo is bacteriophages have no action upon *Pasteurella*.

W F Harvey

CHOLERA

GUINDY REPORT OF THE KING INSTITUTE FOR THE PERIOD FROM 1ST OCTOBER 1940 TO 30TH SEPTEMBER 1941 pp 23-27—*Madras Cholera (Field) Enquiry* [VENKATARAMAN (K V)] under the Director King Institute Guindy

Revisitation of a village in which cholera had occurred six months previously (when *V. cholerae* had been isolated from four out of 196 specimens from 61 contacts) showed on examination of 237 specimens from 49 members of 11 families in whom *V. cholera* was demonstrated during the previous visit an entirely negative result.

These researches have proved the existence of El Tor haemolytic agglutinable vibrios in natural waters. During October 1941 132 specimens of water were obtained from the 33 tanks near Negapatam which had been repeatedly examined in the previous year. Eight specimens (from eight sources) yielded agglutinable vibrios. These were agglutinated by the Ogawa type of cholera serum. The eight sources mentioned are different from those previously recorded positive [See also this *Bulletin* 1942 Vol 39 p 160].

The high colour of the mannose solution made from ivory nut was got rid of by allowing the hydrolysis to proceed at 45 C over eight to ten days [See this *Bulletin* 1939 Vol 36 p 901].

Endemicity as a term applied to a purely administrative district evidently needs qualification. In Tanjore for example the seasonal incidence of cholera varies in different parts so that cholera may disappear in one locality only to start in another. The result may therefore be a spurious type of endemicity due possibly only to an official conjunction of administrative areas. Naturally no district desires to be stigmatized as endemic for cholera.

W F Harvey

8 One may frequently note no pathological phenomena even in the plexuses of the large intestine or along the affected neurones—a great number of unchanged cell and fibres surrounded by proliferating histiocyte Schwann elements and satellites.

9 These diverse microscopic pictures are apparently linked with the variations of the reaction and are a matter of controversy among the neurobiologists.

10 In the cerebrum and spinal cord there were noted in some case destructive changes of the ganglionic cells (cortex nuclei of the mid brain, medulla oblongata and spinal cord).

11 It may be assumed from the above data that in dysentery we are dealing with toxic shock phenomena associated with disturbances in the barrier reactions of the organism and subsequent affection of the parenchymatous elements of the central as well as vegetative nervous system.

12 This suggestion emphasizes the rôle of the active connective tissue in dysentery as the problem of great practical significance as regards the application of curative factors (non specific and specific stimuli).

LYON (George M.) The Chemotherapy of Bacillary Dysentery Further Observations on Sulfaguanidine—U S Nav Med Bull 1942 July Vol 40 No 3 pp 601-608

More than 300 patients were treated with sulphaguanidine. With few exceptions the method of administration was that originally recommended by MARSHALL. The initial dose was 0.1 gm per kilo the maintenance dose 0.05 gm per kilo every four hours till the stool were less than 3 in 24 hours and then 0.05 gm per kilo every 8 hours for 48-72 hours. The urinary output must be maintained.

The favourable improvements previously recorded were confirmed and when treatment was commenced during the first five days recovery usually occurred in 2-3 days. In the majority of cases the early chemotherapy was sufficient. When so used sulphaguanidine was free from toxic effects. The importance of early treatment cannot be over-emphasized. But when there was blood and pus in the stool even though treatment was not commenced early the results were nearly as satisfactory.

In the post infection intestinal indigestion with greenish watery stools sulphaguanidine had the least satisfactory results. Intestinal indigestion as formerly very common among infants and young children and is still not infrequent in dysentery patients not receiving chemotherapy.

The best results with sulphaguanidine were obtained in those patients treated at the earliest moment after onset and who were passing blood and pus. It was least effective in those in whom chemotherapy was not commenced till the bacterial invasion was over. Sulphaguanidine appears to be equally effective against all dysentery bacilli. Most of the toxic effects which have been observed with other sulphonamides have occurred with sulphaguanidine when given in larger doses than recommended and when due attention is not given to the character of the stools. Except in new born children no death has occurred among patients treated with sulphaguanidine provided that treatment was commenced during the first five days of illness but parenteral infection whether due to influenza virus or

pathogenic bacteria exerted a detrimental effect. Those patients who were promptly treated showed surprisingly little disturbance of digestion either during the period of active therapy or after recovery.

In spite of this it was deemed advisable to employ a bland diet materially restricted in amount during the period of active treatment. Relapses early or delayed were extremely rare after sulphaguanidine treatment.

Succinyl sulphathiazole was employed in 14 patients. The maintenance dose was 0.04 gm per kilo every four hours with an initial dose of twice that amount. The results appeared to be as favourable as sulphaguanidine and there was entire freedom from untoward effects.

P. Manson Bahr

BIBIKOVA (T. I.) Treatment of Dysentery with Methylene Blue — *Arch Sci Biol* 1941 Vol 62 No 3 [In Russian pp 99-102]
With 1 fig. English summary p 103

1. Treatment of dysentery by intravenous injection of methylene blue is undoubtedly effective with regard to the forms of the disease caused by *Bac. Hiss Flexner*.

a. In a great percent of cases particularly in medium grave forms it aborts the disease.

b. In grave cases it produces a definite change towards amelioration of pathogenesis where the disease has not been aborted. Moreover it improves subjectively the state of the patient in soothing the pains and tenesmus.

2. The injection of methylene blue does not produce a clinical effect in grave forms of dysentery caused by *Bac. Shigae*.

3. Methylene blue should be regarded as a non specific factor which alters the reactivity of the organism.

SIEDER (Hans) Ueber Dünndarmfunktionsstörungen nach Ruhr und ihre Behandlung [Disturbance of Small Intestine Function after Dysentery Treatment] — *Wien Klin Woch* 1942 Aug 21 Vol 55 No 34 pp 666-669 [10 refs]

This paper is based upon observations made in a military convalescent establishment. The author was impressed by the fact that a small proportion of bacillary dysentery convalescents in whom healing of the intestinal mucosa was protracted and who continued to suffer from digestive disturbances as is so often the case showed definite evidences of defective fat absorption due to catarrh of the small intestine. This was especially the case in those who developed rheumatic symptoms due to dysenteric intoxication. There were also subjects who developed icterus who some time previously had suffered from bacillary dysentery. These also as a rule showed very distinct evidences of prolonged disturbance of fat absorption. In this instance also the origin of the jaundice appears to be small intestine catarrh. There is no evidence that these sequelae of dysentery are to be regarded as allergic in nature. In the treatment of this absorptive defect nicotamide (Nicobion) had an immediate and striking effect. Pancreatic preparations are especially helpful in cases with hypochlorhydria. But in vagotonic cases with fat absorption defects improvement is much more difficult to effect. Campolon injections

and tannalbin were also tried but no favourable conclusions were reached. The former appeared to affect the condition of the stool in one instance only. With nicotamide on the other hand improvement in the stool as well as in the general condition of the patient was evident.

P Manson Bahr

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

WESTPHAL (Albert) Experimentelle Amöbenruhr beim Kaninchen
[Experimental Amoebic Dysentery in the Rabbit]—*Deut. Trop. Ztschr.* 1941 Vol 1 Vol 45 No 21 pp 653-657 With 2 figs

Attempts by many observers to infect rabbits with *Entamoeba histolytica* have failed because in the author's opinion the contents of the intestine are unsuitable for the establishment of this amoeba. He has noted previously that if the contents of the caecum are altered by feeding the animals on a corn and bread diet in place of the usual green food it is possible to produce an infection with *Balantidium coli* which establishes itself in the caecum. By the same means the author attempted to produce infection with *E. histolytica*. After a number of trials one animal in which cysts had been administered acquired an ulceration of the caecum in which numerous amoebae occurred. It is claimed that the character of the lesions showed that as in kittens the amoebic invasion was secondary to a previous bacterial damage to the mucosa.

C M Heydon

COUTTS (Waldemar E.) & HERRERA (Juan Martini) Amebiasis urinaria. Comunicacion de un caso de infección protozoica producida por *Entamoeba histolytica* (Urinary Amoebiasis due to *E. histolytica*).—*Med. Moderna* Valparaiso 1941 Feb Vol 15 No 7 pp 327-329

The case reported is one of nephritis in which the turbid urine contained large numbers of red blood corpuscles, pus and epithelial cells. In addition the urine contained amoebae which from their movement, nuclear structure and included red blood corpuscles were identified as *Entamoeba histolytica*. At a later examination in hospital a large number of amoebae were seen in the urine. There was cardiac hypertrophy and bilateral retnitis. In the absence of evidence of cystitis a diagnosis of amoebic pyelitis with glomerular nephritis was made. Considerable improvement in the suppurative condition followed administration of emetine.

C M Heydon

CAMERON (J. A. M.) & COLLINS (J. C.) Intestinal Obstruction by Amoebic Granulomata.—*Jl. Roy. Army Med Corps* 1941 Sept Vol 79 No 3 pp 140-141 With 1 chart

[An hypertrophic type of amoebic disease is not usually thought of in making a differential diagnosis of large bowel tumours (the large qualitative bowel not tumours).] If more cases like the present were as carefully recorded as thus medical officers at all events those with tropical experience would at once bear in mind

amoeboma or amoebic granuloma as a possibility and not think only of malignant disease syphilis tuberculosis and polyp under like conditions]

A man of 27 years gave a history of abdominal pains for the preceding 48 hours worse in the last 24 hours and accompanied by vomiting signs pointing to intestinal obstruction were present (but the pulse remained normal and the vomiting ceased) A tender annular swelling was felt an inch above the anal sphincter and a mass in the rectovesical pouch Laparotomy was performed and in the rectal ampulla was a mass the size of a non gravid uterus and another the size of a tennis ball in the transverse colon to the right of the midline where clinical examination had revealed acute tenderness Caecostomy was performed During the next 16 days there was intermittent fever up to 101 F and leucocytes numbered 14 000 or more per cmm with a relative polymorphonucleosis [This is unusual in these cases] Repeated stool examinations were negative for ova parasites and cysts The fact of involvement of the parietes as a fungating mass afforded the clue to its amoebic nature [no mention is made of histological examination of this or the bowel tumour] Emetine was prescribed although no entamoebae had been seen and after three grains had been taken the temperature became normal but the course of 12 grains was completed and followed by 0.25 gm carbarsone twice daily for a month The wound cleaned and healed in a month after the emetine was started and recovery was uneventful and complete

H Harold Scott

Niño (Flavio L) Tumores inflamatorios amibianos del intestino grueso (Contribución a su estudio [Amoebic Tumours of the Large Intestine]—*Bol Inst Clin Quirur* Buenos Aires 1942 May Vol 18 No 145 pp 153-213 With 7 plates 7 charts and 28 figs [31 refs] English summary

This is a professorial thesis and constitutes an able review of the subject of amoebic tumours of the caecum and colon illustrated by five cases The author treats the question in six sections and one of general conclusions and bibliography The first gives a brief account of the history of the condition starting with a quotation of the case of RICARDONI and BERTA (published in 1916) in which a hard painful swelling the size of a fist was found in the right iliac fossa and was diagnosed as hypertrophic tuberculosis of the caecum The caecum ascending and part of the transverse colon were removed and histological examination showed that the swelling was due not to tuberculosis but to *E histolytica* Other cases recorded down to 1937 are referred to In section II the author discusses the name of the amoeba and concludes that it ought to be known as *Entamoeba dysenteriae* Councilman and Laffeur 1893 Next follows a chapter on the pathological anatomy and histology with good illustrations and a coloured plate showing the lesions The symptomatology and diagnosis are then discussed the latter depending on the history and the course of the disease the results of sigmoidoscopy and examination of the faeces The therapeutic test is confirmatory After a brief section on prognosis and treatment the author's five cases are detailed and reproduced [The whole is a good account of a subject which it is true is described in the text books but which is likely to escape notice on account of its comparative rarity]

H Harold Scott

BERNE (C J) Diagnosis and Treatment of Amebic Liver Abscess
 —*Surgery Gynecol & Obstet* 1942 Aug Vol 75 No 2
 pp 235-238

That many surgeons in America tend to regard amoebic infection of the liver as a purely surgical manifestation became apparent when it was found that the case mortality from the disease at the Los Angeles County Hospital in 1931 was 85 per cent. Amoebic abscess must be regarded not as some rare exotic but as an ever present possibility in that area. Since that date 74 cases of amoebic abscess have been recognized. Amoebic infection of the colon always antedates liver abscess but many cases of amoebic colitis are clinically silent. Of the author's patients 30 gave a history of diarrhoea 44 had none 6 were constipated.

Cross ulceration of the colon was present in 14 out of 24 in which autopsy was performed and in five there had been no diarrhoea. The surgeon may therefore be forced to diagnose amoebic hepatic abscess in the absence of any signs of the primary disease. In 55 cases in which faeces were examined trophozoites or cysts were found in 40. There were only five women and no patient was under 20 years of age. Alcoholism was not a factor but a seemingly important relationship does exist between trauma and amoebic abscess. This aspect has medico-legal significance. Ten cases were not recognized before autopsy and the condition was probably responsible for death in an equal number of cases which did not come to autopsy. This diagnostic difficulty in Southern California may be ascribed to the fact that amoebic hepatic abscess presents many manifestations not usually described in text books. Instead of being chronic in 58 per cent the process was an acute severe disease. In 33 per cent abdominal features were absent or minimal and the clinical phenomena were pulmonary.

Four syndromes are recognized: acute and chronic costal, acute and chronic pulmonary. The chronic costal type includes classical cases misdiagnosed as carcinoma of liver, stomach, gall bladder or colon, amyloid disease, Echinococcus or pancreatic cyst or *hepar lobatum*. The acute costal type is usually mistaken for acute cholecystitis, penetrating or perforated duodenal ulcer or abscess complicating peptic ulcer or cholecystitis. The chronic pulmonary type closely resembles cancer of the lower lobe. In the acute pulmonary form basal pneumonia is repeatedly diagnosed as is empyema when effusion occurs. In such cases a bronchial fistula may result.

If the left lobe of the liver is involved the process may be acute or chronic and the phenomena occur in the epigastrium rather than at the left costal margin.

The primary basis for cure of amoebic abscess is emetine in sufficient dosage. Amoebic abscess is a special type of liver necrosis and emetine is as much a specific as nearsphenamine for a gumma. Two factors tend to confuse the situation: first the gross resemblance to bacterial infection, second timidity in administering adequate amounts of emetine.

In a third of the series the abscess content was not anchovy sauce pus but was creamy white puriform material. In a number of instances it had a foul odour. Except in three cases in which extensive lung and diaphragm destruction existed every abscess was sterile.

Hesitation in giving adequate emetine is based upon fear of the capacity of the drug to injure the myocardium. As a result many patients with amoebic abscess have retained excellent hearts but have died of insufficiently treated amoebic abscess. Emetine was given in 1 grain doses daily intravenously or intramuscularly for six doses then a rest for six days. As much as 24 grains have been given and not one cardiac problem has developed.

Electrocardiography in conjunction with observation on blood pressure is of great help in controlling therapy.

Cases treated with emetine only. 19 patients were treated with complete recovery in all. The largest dose was 16 grains—average 9½ grains. The drug was administered intravenously in 10 and intramuscularly in nine. In this group were four cases in which aspiration yielded nothing. An aid in measuring inactivation of the infection is the blood sedimentation rate which has constituted an important guide in indicating need for further treatment.

Cases treated with emetine and aspiration. A group in which after emetine therapy the response is not satisfactory or a mass exists aspiration then becomes necessary and may require repetition. For this procedure a cerebral ventric needle forms an excellent instrument. Believing that dome abscesses are repeatedly missed by the customary procedure the author prefers to aspirate high along the right costal margin upwards outwards and backwards. By this method 18 cases were treated with no deaths. Three required three aspirations each the largest amount extracted at one time was 2200 cc the smallest 45 cc.

The surgically treated series comprised 26 cases. 14 adequately treated with emetine. The mortality was 53 per cent but clinically this group was not very comparable with the preceding groups. In four there was acute intraperitoneal rupture. One death was due to open drainage with resultant post operative bacterial infection of the liver.

WESTPHAL (Albert) *Ein Kulturverfahren für Entamoeba gingivalis und dessen Anwendung für die Differentialdiagnose von E. gingivalis und E. histolytica* [Culture Method for *E. gingivalis* and for its Differentiation from *E. histolytica*].—*Deut Trop Ztschr* 1941 Nov 15 Vol 45 No 22 pp 685-690. With 18 figs.

The author describes the cultivation of *Entamoeba gingivalis* in a medium consisting of a special serum Ringer's solution over a solid serum agar slope. In this medium by subculturing every second day it is possible to maintain a strain indefinitely. The medium is useful for diagnostic purposes as the amoeba was isolated in it from 73 per cent of apparently normal mouths. In the fresh condition *E. gingivalis* resembles *E. histolytica* but it tends to move in one direction more so than does *E. histolytica*. When fixed with sublimate alcohol *E. gingivalis* retains its amoeboid form with its ectoplasmic pseudopodia while *E. histolytica* shows a greater tendency to become rounded.

RISSMANN (E F) *Ueber die Lambliasis intestinalis im Generalgouvernement [Intestinal Giardiasis in S Poland]*—*Med Klin* 1942 June 5 Vol 38 No 23 pp 532-534.

During the two years period 1939-1941 in the hospital in Cracow 26 cases of *Giardia* infection were diagnosed by the discovery of the

flagellate in material obtained by duodenal tube. The incidence of this infection is not high for in 1941 alone the operation was carried out on 686 cases. The author is convinced that Giardia is responsible for the symptoms in the cases in which it was found and that these are mainly of three types—gastro-intestinal, cholangitic and cachectic. Atebrin treatment has given uniformly good results. C. M. Wenyon

HEADLEE (William Hugh) Intestinal Parasite Infections among In-Patients of the Indiana University Medical Center Hospitals—*Amer J Trop Med* 1942 July Vol 22 No 4 pp 341-350 With 1 map 20 ref.]

An examination of 258 patients revealed the following infections and percentages: *Entamoeba histolytica* 0.8, *Entamoeba coli* 25.6, *Endolimax nana* 12.4, *Iodamoeba butschlii* 0.8, *Giardia intestinalis* 9.7, *Chilomastix mesnili* 0.8, *Trichomonas hominis* 1.2, *Ascaris lumbricoides* 0.8, *Trichuris trichiura* 0.8, *Necator americanus* 0.4, *Enterobius vermicularis* 5.0, *Hymenolepis nana* 0.4. Of the patients examined 37.6 per cent showed infection with one or more of the above parasites. The final conclusion is that the data presented add to our knowledge of the incidence and distribution of human intestinal parasite infections in Indiana which are of sufficient importance to warrant more than a casual interest on the part of the clinician. C. M. Wenyon

HEADLEE (William Hugh) & CABLE (Raymond M.) Intestinal Parasitism among Students of Berea College Kentucky—*Amer J Trop Med* 1942 July Vol 22 No 4 pp 351-360 [29 refs]

The infections recorded in this paper are based on the examination of 2,393 individuals, 69.9 per cent of whom were in the age group 16-20 years. The parasites and percentages found are as follows: *Entamoeba histolytica* 5.0, *Entamoeba coli* 50.2, *Endolimax nana* 42.3, *Iodamoeba butschlii* 11.3, *Giardia intestinalis* 5.7, *Chilomastix mesnili* 1.0, *Trichomonas hominis* 0.04, *Ascaris lumbricoides* 5.1, *Trichuris trichiura* 7.9, *Necator americanus* 14.6, *Strongyloides stercoralis* 3.8, *Enterobius vermicularis* 0.4, *Hymenolepis nana* 0.5. Of the total number of individuals examined 75.5 per cent harboured one or more of the above parasites. C. M. Wenyon

LAW

MAS E (G.) La dermatose nodulaire et ulcéreuse de l'Ubanga et ses rapports avec le pian (Nodular and Ulcerative Dermatitis in Ubanga Relationship to Yaws)—*Ann Soc Bel de Med Trop* 1940 Sept 30 Vol 6 No 3 pp 287-295 With 16 figs on 7 plates.

The author describes the well known gummatous nodules and ulceration of the skin so prevalent where yaws is pandemic. He confirms the generally accepted view that tertiary yaws (and more rarely syphilis) is responsible and that other names are redundant. He thinks that

trauma plays a part in the right arm and lower limbs. Dr PICARD of the Cancer Institute of Louvain found endarteritis obliterans in one nodule and calls it the signature of syphilis. There was no evidence that the patient had been syphilitic but he certainly had had jaws.

C C Chesterman

LEPROSY

DENECKE (Karl) Ergebnisse eines statistischen Querschnittes einer westafrikanischen Leprosie und Untersuchungen der Leprosen deren Verwandten und Kinder [Statistics of a West African Leprosarium]—*Arch f Hyg u Bact* 1942 Vol 128 No 2 pp 102-111 [11 refs]

The author reports on a study of leprosy in the Spanish West African Colony of Rio Muni immediately to the south of the Cameroons. The disease is widespread in this moist hot forest-clad area among the indigenous people especially in the island of Fernando Po. Two leprosaria near the Cameroon border accommodate a number of cases under a Government doctor in one of these the present inquiry was made. Employment in brickworks and on agriculture is supplied. The author examined 104 cases and found the highest incidence among men of 30-39 and women of 20-29. He discusses the subject of hereditary transmission in the light of data regarding the number of the children one or both of whose parents were lepers who developed the disease and of other infected relatives. The average number of children in families in which leprosy was present was five and of these the average number of infected was only $1\frac{1}{2}$ but in twelve families in which one or both parents were lepers the proportion of infected children was 14 or nearly the same figure. He concludes that all the known data are against hereditary transmission. The author regards infection through wounds as the most common form and considers the incubation period to be long. Unfavourable diet predisposes to infection and the indigenous diet consists chiefly of carbohydrate with very little animal protein. Yams are extensively consumed but in a reference to the recent suggestion that their consumption predisposes to leprosy he points out that the healthy eat them as much as the infected. He next discusses the marriage of lepers and records that 75 lepers with leper wives had only 27 children but 72 with healthy women partners had 164 children so that the greater part of the leper couples namely 56 out of 70 were sterile against only 20 out of 72 when one partner only was a leper. Both classes had an equally high child mortality. Miscarriages were comparatively few. Clinically only nine cases were of the nodular or lepromatous type so the nerve form predominated. *Lepra bacilli* were found in the nasal discharge in 18 per cent in the blood in thick smears in 20 per cent and in the skin in 24 per cent. Under local treatment is described a native method of cauterizing skin lesions with eharecoal or rubbing them with sandpaper. Pigmentation may result. Oil of the gorli seed from the forests is also used locally as a salve. Sodium calomel made from the gorli seed is also used intravenously as well as *Hydrocarpus wightiana* preparations. A large number of the

patients suffer from malarial and filarial infections and in only 11 of 103 examinations were the ova of worms not found in the stools. Sleeping sickness is a not uncommon complication. *L. Roers*

Rossas (Thomas Pompeu). A lepra no Maranhão [Leprosy in Maranhão] — *Arquivos de Hygiene* Rio de Janeiro 1941 Dec Vol 11 No 2 pp 27-31 [12 refs] English summary

In the decade 1922-39 there were 990 registered lepers in Maranhão 662 males and 333 females. When a census was taken in 1939-41 there were 1,600 old cases and 1,030 new of these 830 were discovered in a medical survey 114 were in the leprosarium or Capital Dispensary and 26 at the Health Department posts. Medical men at their survey examined 64,191 persons 5.8 per cent only of the total population (1,100,788). Tables are given showing the sex distribution of the total of these 836 (69 per cent) were males 375 (80.9 per cent) females 287 were of the lepromatous type 610 the nervous and 214 mixed 201 were infected and 710 were burnt out cases. Other tables give the incidence in different parts of the municipality. The clinical types in each department and the numbers of infective cases. As regards incidence the greatest number 208 were in São Luiz among a population of 64,353 a rate of 2.4 per mille. The highest rate was in Anajatuba where there were 79 lepers in a population of 13,729 or 5.7 per mille. The second largest number as found in Caxa. 84 among 67,358 which however gives an incidence of only 1.2 per mille. Factors favouring the high incidence are that lepers mix freely with the general population many of the people are very poor and live in dark damp thatched huts they are ill nourished and in their debilitated state fall ready victims to disease and there is little or no attempt at efficient prophylaxis by removal of these drawbacks though there is a leprosarium of the colony type at Bonfim on the shore of the island of São Luiz. This was started in 1837 and opened in 1837. In 1933 there were 152 inmates and 18 deaths. In 1939 163 patients 9 deaths. In 1940 194 (18 died). At the end of May 1941 inmates numbered 183. At the São Luiz dispensary in 1940 45 new cases received treatment and 31 were sent to the leprosarium. *H. Harold Scott*

Di Bois (A.) & Gavrilov (N.). Essais d'inoculation de la lèpre humaine au hamster non plénectomisé [Inoculation of Human Leprosy to the Hamster] — *Ann Soc Belge de Méd Trop* 1941 Sept 39 Vol 21 No 3 pp 189-194

The authors report on 16 negative results from the inoculation of hamsters with human leprosy material obtained in 12 cases from the Congo by air in nine days and with fresh material in the other four and without previous removal of the hamster spleens. Ten of the animals lived for six months and a few but the results were negative with the exception of one animal which developed extensive lesions containing acid fast bacilli but the organ in produced to be Stefansky's bacillus of rat leprosy. They are unable to explain but are in agreement that such infections are far from being of regular occurrence. *L. Roers*

MUÑOZ RIVAS (Guillermo) Algunas observaciones relacionadas con las pulgas y la transmisión de la lepra (Notas preliminares) [Fleas and the Transmission of Leprosy]—*Rev. Facul. de Med. Bogotá* 1942 Apr Vol 10 No 10 47 pp With 9 figs [48 refs]

[So long as the mode of transmission of *Mycobacterium leprae* is unknown it is as well to try out all possibilities. The reasons for suspecting fleas are slender—namely (1) That the flea is universal (2) That warm and moist countries are the homes of leprosy and also favour fleas (3) That they flourish in rooms, clothes and among leprosy associates (4) That they may contaminate themselves in the larval or imago stages (5) That their length of life affords abundant chance of reinoculation.]

The author set himself to examine first for acid fast bacilli in the stomach contents of fleas caught in the Leprosy Dispensary at Cundinamarca. Among 200 *Pulex irritans* captured 32 contained these organisms which moreover could not be cultivated on Löwenstein-Jensen medium. Of another 30 allowed to feed on lepers 20 were positive at intervals between 4 and 48 hours; on the other hand none of 53 controls had any such organisms in their stomach contents. The same result was obtained in 50 *C. canis* whereas of 14 allowed to bite lepers seven were positive one up to four hours and six to 48 hours.

He next examined the larvae—all of 20 *P. irritans* larvae and of 54 *C. canis* larvae fed on infective material were positive—none of 41 of the former and 73 of the latter which were examined as controls. He observed that the bacilli in the positive larvae broke down to acid fast granules. Of six nymphs of highly infected *C. canis* one was positive and two out of three of those of *P. irritans*. Of 47 larvae of these two species of flea which were caught in the dust of the dispensary 31 were positive but only one of 12 nymphs—one adult *P. irritans* (the only one examined) was positive but none of 10 *C. canis* [it is misleading to call this 9 per cent infection of *C. canis* and *P. irritans*].

In the last section of this article the author discusses the possibilities of other insect vectors. Lice (a few examined were negative) Simuliidae (too short a life) mosquitoes *Triatoma* and *Rhodnius* (absent from many places where leprosy exists) Cimicidae (organisms found by some authors but leprosy exists where these cannot be found) ticks (several examined with negative results and again leprosy is present in places where there are no ticks) *Musca* and *Tunga penetrans* (no evidence in favour of the former except mechanical transmission to a wound possible of the latter the author has had no experience) [The remarks in brackets are the author's reasons for ruling the insects out.]

H. Harold Scott

COCHRANE (R. G.) Prognosis and Treatment of Leprosy with Special Reference to its Pathology—Reprinted from *Jl. Christian Med. Assoc. India, Burma & Ceylon* 1942 May 9 pp With 13 figs on 6 plates

The author stresses the difficulty in correct prognosis and treatment without having clear ideas on the pathology of leprosy. Progress during the last five years has greatly increased the accuracy of prognosis. Most adults have a great resistance to leprosy and there is a strong tendency for the mildest nerve forms to recover spontaneously; it is therefore important to be able to recognize the more serious types.

in order to foretell their future course. A table of the proportion of improvement without treatment in the author's Madras clinic in the different types showed 43.5 per cent in simple macular (neural), 60.4 per cent in tuberculoid macular (neural) minor, 75 per cent in tuberculoid major and 27.8 per cent in the incipient lesions of childhood described by the author, making 53.1 per cent of the total 299 cases. Improvements were three to five times as frequent in cases giving a positive lepromin reaction as in negative cases. Neural cases very rarely become lepromatous but five of 23 incipient ones did so.

The cellular reactions in the lesions of the different types are next dealt with and the strong cellular resistance of the nerve types illustrated by the tuberculoid and tissue reactions leading to destruction of lepra bacilli is emphasized. The absence of such resisting power which enables the infective organism to multiply enormously and become distributed throughout the body by the blood stream makes the lepromatous variety much more serious. In the case of infection of the nerve trunks the tuberculoid cellular multiplication may even form abscesses within the nerve sheaths and so damage the nerve fibres as to result in permanent destructive lesions. The vital organs however are not attacked even in the lepromatous cases. Tables are given of the well established points of differentiation of the various types together with microphotographs illustrating the pathology and photographs of a few clinical cases before and after treatment. This was on the usual lines by means of the hydriocarpus preparations especially sters given intradermally. *I. Roers*

REENSTIERNA (John). Further Therapeutic Tests with an Anti Leprosy Serum (In Netherlands East Indies and Other Countries) —
Acta Med Scandinavica 1941 Supplement 118 195 pp
With 17 plates

Professor Reenstierna has been working enthusiastically for years on the value of a serum which has been prepared by the repeated injections of sheep with an acid fast bacillus cultivated by him from the blood of a leprosy patient and similar to that of Hedrow's. This bacillus is regarded by the author as the causative organism of leprosy. Although few leprologists at the present time would accept that opinion this does not affect the evaluation of his serum in leprosy. All the cases treated since Professor Reenstierna's report in the *International Journal of Leprosy* Vol 6 early in 1938 are included in the present volume and relate to seventeen countries from some of which only brief accounts in letters or cables are available. It may be recalled that the course advised is three doses of 10 c.c. each intragluteally in the course of three months. [See also this *Bulletin* 1938 Vol 35 p 299.]

In attempting to form an opinion on the value of the voluminous further evidence recorded in this volume the very modest claims of the author must be borne in mind. He considers fully developed lepromatous cases to be unsuitable for his treatment. On the other hand photophagy and illustrations are recorded to show improvement in the muscular power of the fingers and hands and of the facial muscles and return of sensation. Further the healing of nasal ulcers as well as those of the extremities and improvement in the blood sedimentation rate and of the sputum are recorded in some cases although in the

last only the patients impressions are mentioned. He also emphasizes that in a large proportion of the cases the serum was used only after the failure of prolonged treatment with chaulmoogra preparations which when possible are omitted for a month before the serum is tried. In his paper of 1938 referred to above he concludes that his serum should become a good auxiliary to the standard therapy with chaulmoogra but he does not advise their being used at the same time because chaulmoogra oil seems to interfere in some way with the action of the serum. Unfortunately no analysis of the most important features of the cases has been made by the author so the reviewer has tabulated those of the 107 cases in which detailed information of the conditions before and after treatment are recorded in order to allow a reliable estimate of the evidence to be given.

The first noteworthy feature is the considerable duration of the symptoms at the time of treatment in a large proportion of the cases. Only five appear to have been of less than one year's duration and four more of under two years but nearly half were of five to fifteen years duration. Nearly 40 per cent were lepromatous or predominantly lepromatous cases in which the author would not expect improvement except in any accompanying nerve symptoms. Unfortunately largely owing to the handicap of the war and to the short time the author was able to spend on visits to particular leper institutions to which he supplied his serum in the great majority of the cases the progress reports were made only a short time after the treatment was commenced and frequently before the full course had been carried out. In these cases only the immediate results following use of the serum are recorded so it will tend to clarify if these are first considered.

It is unfortunate that the detailed reports of eight cases treated by RYRIE in Malaya were made only six days or less after the commencement of the treatment for they were all of the more favourable nerve and tuberculoid type and of comparatively short duration. Most of them showed some degree of improvement in sensation and in the movements of the fingers. In Burma LINDSAY reported the detailed changes in five to twelve days after the commencement of treatment in 20 cases all nerve or predominantly nerve cases. Here again in rather more than half the cases improvement of sensation was noted to some extent and in the remainder that condition was stationary in four cases nasal ulceration and in four others ulcers elsewhere showed some improvement. In several cases some improvement was observed in the movements of the facial or hand muscles but in about an equal number the condition remained stationary. Fortunately a further general report on the results 40 days after the commencement of the treatment was received from Lindsay in which he reported further improvement in the ulcers of some cases but retrogression in others. A further report three months after the first treatment summarizes the results up to that time briefly thus: some improvement of minor nerve lesions of the fingers and eyelids had been maintained some ulcers had healed remarkably others showed no change or became worse and some new ones appeared. The results regarding anaesthesia were equally variable and in quite a number the areas increased in number and size. All the patients said they felt better in health but most relapsed within four to eight weeks.

Apart from four old cases there remain an important series of 70 cases treated in different places in the Dutch East Indian Islands some of which had previously been reported elsewhere. Here again

with the exception of five very advanced cases reported on over one year after treatment (but all of whom died within the next year or two) the time of the reports after commencement of treatment varied from $1\frac{1}{2}$ and $2\frac{1}{2}$ month through five weeks down to a few days so only the early results of the use of the serum are available in a proportion of cases. It is however noteworthy that in the five advanced cases reported over a year later paralyses and ulcers of the extremities were noted to be improved in all ulcers of the nose in four sensation in two and in four the patients stated that their sight was better although no tests are recorded. In three the general condition was improved in one stationary and in one worse. Of the 69 cases observed from a few days to $2\frac{1}{2}$ months sensation was noted to be improved in more than half paralyses in about one-third nasal ulcers improved in over one third in a number of which they had healed and ulcers of the extremities had improved in about one fifth with occasional healing. These data are in very fair agreement with those above from other countries when we take into account that a number of predominantly lepromatous cases are included in the Dutch East Indies series. Two of the Dutch series reported on elsewhere furnish some later information. Seven cases reported from Batavia by BOENJAMIN [see this *Bulletin* 1940 Vol 37 p 46] showed improvement in two improvement coupled with retrogression in three stationary one and worse one. Again cases 30 to 35 at Semarang without detailed data were reported on by MALAIHOLLO [see this *Bulletin* 1939 Vol 36 p 694] who found no benefit in lepromatous cases temporary improvement in nasal symptoms in nearly all the cases improvement in other than perforating form of ulceration in anaesthesia in anaesthetic macules and in paresis in a few only.

Lastly a report by BALINA who contrary to the advice of Reenstierna treated 10 rather advanced lepromatous cases records that he could not establish any evidence of improvement. This result is confirmed by the analysis of the reviewer which showed that in 6 lepromatous cases injections of the serum were followed by febrile reactions accompanied by deterioration of the patients in one case to a serious degree. Balina's experience is a confirmation of Reenstierna's advice on this point.

The remaining brief general reports of trials of the serum recorded in this book for the sake of completeness are in accordance with the above analysis. We may therefore conclude that the very moderate claims of the author that in nerve forms of leprosy rapid amelioration for a time at least of sensory and paralytic symptoms healing of ulcers in the nose and of non perforating ulcers of the extremities and occasional improvement in macules often follow the injections of his serum which may therefore be of some value as an adjuvant to other treatment of leprosy. There is not however yet sufficient evidence to show that such amelioration is commonly of a lasting nature.

L. Roers

TRANT (H) Clinical Observations and Notes on the Treatment of Early Leprosy with Diphtheria Antitoxin—*East African Med J* 1942 Aug Vol 19 No 5 pp 147-149

This note records that about 15 patients in the early stages of leprosy who were awaiting discharge and repatriation were at a Nairobi hospital given a variable number of intramuscular injections of

2 500 units of diphtheria antitoxin bi weekly There were no general or febrile reactions and only slight neuritic pains were noted The results of the injections on the local lesions were on the whole moderately encouraging but no bacteriological controls were made In maculo-anæsthetic cases the results were more disappointing The method is thought to be worthy of further trial *L Rogers*

PERVES Application de l'infiltration du ganglion étoile au traitement de troubles trophiques du membre supérieur dans la lèpre [Ganglion Infiltration in the Treatment of Nerve Leprosy]—*Rev Sci Med Pharm et l et de l'Afrique Française Libre* Brazzaville 1942 July Vol 1 No 1 pp 76-80

The results of infiltration of novocaine in the region of the inferior cervical or stellate nucleus of the sympathetic in the treatment of leprosy nerve lesions of the upper extremity are recorded The method is based on the proved value of such treatment of trophic and sympathetic lesions in general A strong needle is inserted 4 centimetres from the middle line on the affected side and on striking the first rib the needle is directed under its inferior border to a depth of 2 centimetres After aspirating to make sure a vein has not been entered 3 to 4 cc of a freshly prepared 2 per cent solution of novocaine is injected At the end of an hour congestion of the corresponding limb is observed and if it lasts at least two or three days good results may be hoped for No dangerous reactions occurred in the cases treated but operations on the left side were sometimes followed by angular pain Within a few hours recovery of the functions of the fingers is obtained oedema is absorbed within two days and ulcers heal within a week Attempts at lumbar infiltrations were not successful Notes of ten cases illustrate the results obtained *L Rogers*

MACKEY (A G) The Control of Leprosy and Tuberculosis in Rural Areas of the Tropics—*East African Med J* 1942 Aug Vol 19 No 5 pp 150-153

The author discusses complete segregation of lepers in leprosanias and partial segregation in village communities in which the patients while living rather apart from the main villages could carry on their agricultural work and continue some degree of social intercourse other than home contact with non lepers For East Africa the latter system would appear to be more suitable and it could be combined with similar partial segregation of tuberculous persons The aim should be that the patients should not feel too completely separated from their fellows yet reasonable isolation should be possible *C H*

HELMINTHIASIS

WARNER (B W) Anorectal and Colonic Manifestations of *Schistosoma mansoni* Infestation (Intestinal Bilharzia)—*Amer J Surg* 1942 July Vol 57 No 1 pp 168-172 With 3 figs

This paper is mainly a statement of the life history and pathological effects of *Schistosoma mansoni* with a warning to American surgeons

that they should be on the look-out now for cases of all the schistosomes in soldiers and others returning from areas in which this disease is endemic *S. japonicum* coming also into the picture.

The author describes one case of infestation with *S. mansoni* a woman aged 26 who was born in Porto Rico and had lived there for 20 years before coming to New York. She was operated on for chronic salpingo-oophoritis, corpus luteum cyst of the ovary and fibrosis of the appendix. There was then no eosinophilia in the blood but there was a slight eosinophilic infiltration of the muscularis of the appendix. After the operation the patient still had slight rectal pain and bleeding. Examination showed a tender post anal crypt with posterior fissure and multiple small papillomata near the recto sigmoidal junction above this junction the sigmoid was normal. The stools were not examined.

The post anal crypt was excised and eggs of *S. mansoni* were found in it. The sections of the ovary and Fallopian tube and the appendix made when these were removed were then examined but no eggs were found in them.

The posterior ano-cutaneous wound developed excess granulation tissue but no eggs were found in this. The sigmoid showed punctate bleeding areas which were interpreted as points from which egg had escaped. Repeated stool examinations and direct rectal smears showed occasional distorted eggs. About a month after the second operation the blood showed an eosinophilia of 7 per cent this being the first time it had been noted. At the same time X-ray examination of the chest showed the presence in the right apex of small areas of infiltration which were interpreted as being probably areas of infiltration of the lung by *S. mansoni*. These infiltrations subsequently disappeared.

When the author wrote his paper the patient was feeling well but the bleeding areas in the sigmoid and rectum were still present. Intramuscular treatment with Isonadim had been begun. G. Laferriere

MAGATH (Thomas B.) Lethal Dose of Chlorine for Cercariae of *Schistosoma mansoni* — *U. S. Nat. Med. Bull.* 1941 Jan Vol 40 No 1 pp 237-238

Active cercariae of *Schistosoma mansoni* which had recently emerged from the snail *Anterioris glabratus* were treated with varying amounts of Perchloron. Notes were taken of the times when the movement of the cercariae ceased and when all activity of their organellae stopped. The table here reproduced gives these results —

Experiments to test the action of chlorine necessary to kill cercariae of *Schistosoma mansoni*

Strength of chlorine (parts per million)	Time to kill	Residual chlorine (Orthotolidin) after 30 minutes	Strength of chlorine (parts per million)	Time to kill	Residual chlorine (Orthotolidin) after 30 minutes
10.0	1 Minute	3.0	0.4	11	0
2.0	4	0.8	0	30	0.1
1.0	6	0.4			

The author says that it appears from these experiments that chlorination to the degree of 0.2 parts per million kills the cercariae in 30 minutes and not only makes the water safe but leaves a margin to avoid biological failures and human errors inherent in water treatment.

Everyone going to Porto Rico and Vieques should be warned not to bathe, wade or swim in any of the fresh water streams or in the water of any locality, unless they are sure that human beings do not frequent the waters above their source of supply. All the streams in these islands should be regarded as being contaminated since a very large proportion of the population have schistosomiasis. The author concludes from the nature of cercariae and from experiments with amoebic cysts that rapid gravity sand filters would also render the water safe, but filtration is not always possible and washing and bathing water must also be treated. The often used method of chlorinating water to the degree of 0.2 parts per million is an efficient method of freeing such water from cercariae. [See also this *Bulletin* 1938 Vol 35 p 600
G Lapage

HOWARD (Stanford) Rare Appearance of *Clonorchis Sinensis* in England—*Post Graduate Med J* 1942 July Vol 18 No 200 pp 125-127 With 2 figs

Human liver flukes are rare in the British Isles and are usually found only at operation. A woman aged 50 who had lived all her life in England and South Wales came to the author complaining of jaundice. She had been well until six weeks before. She was deeply jaundiced but there was no abdominal tenderness. Van den Bergh's reaction showed a strongly positive indirect result. The author thought the case was more than one of haemolytic jaundice and operated.

The gall bladder was found to be distended and it contained 60 stones with an average diameter of 0.7 cm. Cholecystotomy was done. The common bile duct was indurated at the point of its entry into the cystic duct. It was opened below this point but no bile appeared. There was complete fibrous stenosis of the common bile duct at its junction with the cystic duct.

In the hepatic duct a disc like body greenish brown and about as big as a waistcoat button rubbery in texture and slightly curved in its long axis was found. This was diagnosed as a specimen of *Clonorchis sinensis*. No eggs were found in the mucosa of the gall bladder. Numerous operculated eggs were found in the faeces. [The illustration accompanying this paper is not of the actual specimen but is taken from a textbook. It is not possible from the information given to confirm the accuracy of the diagnosis. Recently *Fasciola hepatica* was found in the common bile duct of a patient in Britain see this *Bulletin* 1941 Vol 38 p 382.]

The eosinophilia rose to 11.2 per cent (672 eosinophils in 1 cmm of blood the normal being 72 to 300 per cmm). The patient was treated with injections of 2 cc of colloidal antimony. The first injection was given on the thirty first day after the operation. Five others were given at intervals of three days. After a week the patient went home and a second course of injections was given. She has remained well since. *Clonorchis sinensis* infestations are confined to China and Japan and the trematode requires two intermediate hosts before it can infest man. Man is infested by eating uncooked freshwater fish. There is

no likelihood that this patient could have infected other in England. With the help of the Ministry of Food the author found that Licences had been issued for the importation of small quantities of dried fish from China (Hong Kong) the bulk of the fish thus imported going to Soho. These imports ceased in May 1940. The author thinks that it is conceivable that his patient ate some of this fish in an uncooked salad and thus became infested.

G. Lapsley

SKVORTSOV (A. A.) & TALYSIN (F. F.) On the Cycle in the Development of the Tape-Worm of *Diphyllobothrium munitus*—*Travnik* Acad. Med. Sci. U.R.S.S. Moscow 1941 Vol. 25 In Russian pp. 32-329 With 7 figs. English summary p. 330

An expedition of the Department of Parasitology of the All Union Institute of Experimental Medicine named after A. M. Gorky worked on the island of Olkhon (Lake Baikal) in the summer of 1938. The aim of the expedition was to analyse an isolated focus of helminth diseases and to organize the means of control of helminth infestations in this focus.

The examination of the fishermen's population showed that 42 per cent of the inhabitants were infested with worms. 35 per cent with *Taenia saginata* and 7 per cent with tape-worm, *Diphyllobothrium*.

For the purpose of studying the cycle of development of the endemic tape worm the authors carried out experimental work which permit the following conclusions:

1. The population of the coast of the Lake Baikal is infected through the fishes *Coregonus* and *Salmo gairdneri* by the infected Platyhelminths *Parasitica* and *Salmo gairdneri* by the infected *Thymallus arcticus*.
2. The eggs of the *D. munitus* and *D. sibiricum* give ciliated embryos (cercariae) which float in the water and are swallowed by certain minute euphyrid rotaceans (Cyclopoids). Other larvae the proceroid develop in the cavity of the body of these crustaceans but differ in structure from the well studied proceroid *D. latum*.
3. The infected crustacean (Cyclopoid) are eaten by fishes and on the wall of the intestine of the latter capsules are developed where a third species of larvae the plerocercoids are disposed. The plerocercoid of *D. munitus* develop in large capsules and the plerocercoids of *D. sibiricum* in small capsules.
4. Man is infected with the tapeworm in eating the above-mentioned fish in the way of tripanina (frozen raw fish cut into little bits) or in some other kind of fish where the plerocercoid have not been killed.
5. Thus the expedition was the first to elucidate the cycle in the development of *D. munitus* which appears to be the endemic species for the Baikal and to receive the data which permit of liquidating the *Diphyllobothrium* foci among the population of Siberia.

ANDREWS (James C.) & WEBB (Bailey D.) The Effect of Hookworm Damage on Levels of Quinine attained in Blood and Urine of Dogs following Single Doses of Quinine Sulfate—*Jl Pharm. & Exptl Therap.* 1942 July Vol. 5 No. 3 pp. 191-195 With 2 figs.

Some clinical workers have ascribed the lack of response of some cases of malaria to quinine to the co-existence of hookworm infestation.

The authors therefore set out to find whether when quinine is given to dogs hookworm damage to the small intestine alters the concentration of quinine in the blood and also its excretion in the urine.

Two dogs were used. Their existing mild parasitic infestations (the species of parasites is not given) were removed by giving 10 cc of tetrachlorethylene with 15 cc of magnesium sulphate and 4-5 days were allowed for the gut to heal. Before the dogs were experimentally infested with hookworm each was starved for 24 hours and given usually in capsules 20 mgm of quinine sulphate per kgm dog weight which represents about the total of the doses per kgm given in 24 hours in human cases of malaria and about three times as much as any single dose given to man. Quinine determinations were made by the method of Kyker Webb and Andrews. This method does not reliably detect amounts of quinine less than 0.7 mgm per litre. The results are compared with control samples of blood and urine taken before giving the quinine.

Fifteen to thirty minutes after the quinine both dogs as well as others used in preliminary work showed signs of cinchonism (evident nervousness and increased respiration rate the latter returning to normal in about 40 minutes). Three such experiments were done on each dog. Then both were given what proved to be only a light infestation by spraying about 2000 hookworm larvae into the mouth. No marked changes were found in the blood or urine.

The dogs were then reinfested by subcutaneous inoculation of 6000 larvae and a moderate infestation resulted with a few hundreds up to 10000 eggs per gm (Stoll egg-counting method). Quinine was then given at intervals of one, two, three and six weeks after the reinfestation and curves typical of those obtained with moderate hookworm infestations were obtained. Seven weeks after this reinfestation both dogs were given 10 cc of tetrachlorethylene and 15 cc of magnesium sulphate. The collection of faeces showed that dog A had then 88 worms and dog B 75 worms. One week later repeated egg counts were negative. The doses of quinine were then repeated.

The curves obtained of the blood concentration and urinary excretion of quinine are illustrated. They show that moderate hookworm infestation has little or no effect on either the maximum blood level of quinine reached or on the time elapsing between the giving of the dose and the attainment of that maximum. This conclusion is based also on other experiments not recorded here. In general almost all the maximum levels of blood quinine attained lay between 3 and 4 mgm per litre and the time needed to reach these was 1-2 hours.

In dogs with a moderate hookworm infestation the blood quinine sometimes but not always reaches higher levels and is maintained longer than in dogs freed from hookworms possibly because there is in the infested dogs an impairment of the mechanism of the metabolic decomposition of quinine. The authors are investigating this question.

Two points are emphasized. The apparent concentration of quinine in the blood shown by the authors' method represents the difference between the rate of income from the small intestine and rate of outgo the latter being roughly divisible into excretion by the kidney and metabolic destruction. In general the total recoveries from the urine varied from 4-12 per cent of the quinine given. The method of Kyker Webb and Andrews does not distinguish between quinine and other cinchona derivatives but the authors are not aware that anyone has shown that any unaltered quinine is excreted in

the urine and they conclude that only a comparatively small percentage of the quinine given by the mouth reaches the urine unaltered

G. Lapa

RAO (S. Sundar) Observations on Filariasis in Lakhimpur and Bimakandy Tea-Gardens (Cachhar District Lower Assam) — *Indian J. Med. Res.* 1942 Apr Vol 30 No 2 pp 348-350 With 1 map

Rao made a filarial survey of nine villages in the tea gardens of Lower Assam. In seven of these villages filariasis is endemic, the infestation being chiefly due to *Wuchereria malaya*. It is probable that the villages were quite free of the disease until about 30 years ago and that the infestation was introduced from Bihar.

A map of the area shows the nine villages, which lie within 1-3 miles of each other in an area of 28 square miles. The soil is mostly clay or sand and the humidity ranges from 70 to 100 per cent from April to October, the average rainfall being 130 inches a year. The total population of the villages is 4,846, being composed of Bengali settlers and coolies from all over India. Water is obtained from wells and from the rivers. There are no drains or sanitation and the people defaecate in the scrub jungle or on open ground.

Examinations of 245 persons were made at night (from 9 p.m. till midnight). Of the 115 who had microfilariae in their blood at night (47 per cent) all being infested with *W. malaya*, except five from one village who had *W. bancrofti*. The villages of Naidal and Robipur had blood infestation rates of 28.2 per cent and 18.9 per cent respectively. Tables give these results. There was no difference in the degree of infestation of males and females.

Clinical signs of filariasis were found in 110 persons (45 per cent). Elephantiasis of the leg was found in 89 cases, of the arm in 16, of both leg and arm in 4. Only one patient had a hydrocoele, this being the sole case of affection of the genitals. There was no case of chyluria.

Comparison of figures obtained by Fraser in earlier surveys indicated that there had been no increase in the incidence of the infestation, but there had been in all of the villages in which the disease was endemic an increase in the number of cases of filarial disease. The infestation does not seem to have spread to neighbouring villages. It is remarkable that villages in extensively cultivated areas were practically free from the infestation, while those in the swampy areas showed a high incidence.

A list of the mosquitoes found is given. There were several species of *Mansonioides* breeding in association with *Pistia stratiotes* and with

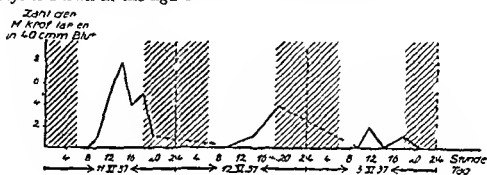
Dob grass. *Culex fatigans* was found only in the village in which *W. bancrofti* infection was present.

G. Lapa

GOVERT (Rudolf) Zur Lebensdauer menschlicher Mikrofilarien [The Duration of Life of Human Microfilariae] — *Zent. f. Bakt.* 1 Abt. Orig. 1942 June 30 Vol 149 No 2 pp 75-81 With 3 figs. [10 ref.]

Various attempts have been made in the past to investigate the cause of microfilarial periodicity by transferring microfilariae from one person into a fresh uninfected person, so that the behaviour of the microfilariae could be studied in the absence of the adult worms. The present paper contributes a new experiment of this type.

A patient from the Cameroons was found at Hamburg to be heavily infected with *L. loa* and *A. perstans*. On November 10th 3 p.m. 160 cc of his blood were taken and injected intravenously into the author with practically no delay. Examination of the blood was made at intervals by taking films of 20 cmm of blood and later by concentrating the larvae from 5 cc blood. The transfused blood contained approximately 1 640 000 *Mf loa* and 112 000 *Mf perstans*. Accordingly it could be calculated that the author's blood should contain 13 *Mf loa* and 1 *Mf perstans* in 40 cmm. actually 15 minutes after the transfusion only 4 *Mf loa* were found in 40 cmm taken from the ear. The number of *Mf loa* found in the blood on the following days is shown in the figure.



Number of *Microfilaria loa* found in samples of the author's blood at intervals after intravenous injection of infected blood of patient

Vertical scale Number of *Microfilariae* in 40 cmm of blood

Horizontal scale Hour and day of observation

[Reproduced from the *Zentralblatt für Bakteriologie*]

As is seen a definite diurnal periodicity of the microfilariae was observed. On November 14th no microfilariae were found in eight drops of blood. On November 16th 5 cc blood were examined and no *Mf loa* could be found. Unfortunately observations on November 12th and 13th could not be made as regularly as was desired owing to the unanticipated reaction which followed the transfusion.

The infection with *Mf perstans* took quite another course as is shown by the table which gives the number of *Mf perstans* per 5 cc blood —

Table I

Date	No of <i>Mf</i>	Date	No of <i>Mf</i>
11 11 36	54*	10 2 37	5
12 11	125*	3 3	1
13 11	50*	19 3	27
14 11	—	24 5	16
16 11	4	25 8	23
25 11	12	15 9	3
2 12	12	28 1 38	3
9 12	26	13 7	2
16 12	15	16 3 39	13
31 12	11	28 12	1
13 1 37	22	6 41	—
27 1	17	16 2 42	—

Calculated values only from samples of 40 cmm blood taken several times each day

It appears from this table that most of the *Mf perstans* disappeared from the blood in the first few days but that some persisted for at

least three years. A similar long duration of life was observed by FULLERBORN in *M. repens* transfused into a fresh dog: the microfilariae persisted 2½ years and during this time they doubled their size. In the author's case microfilariae were drawn under the microscope as they became moribund in a fresh preparation: the lengths of seven larvae ranged from 168 to 200μ (average 190μ). This figure agrees well with the dimensions given by LANGE for microfilariae fixed in formalin: 199.5μ long.

The author had never visited any region with endemic filariasis and so the possibility of latent infection could be completely excluded. A severe febrile reaction was experienced beginning on the evening of the day of the transfusion, maximum on the next day and subsiding by the sixth day. For five weeks after the transfusion the eosinophil percentage was raised to 8-12. It is not clear whether the febrile reaction was due to the blood transfusion or to the disintegration of the majority of the microfilariae.

[The author deserves congratulation for his courage in submitting to this crucial experiment. It is a great pity that more detailed examinations of the blood were not made using a concentration technique throughout and particularly that more measurements were not made during the first and second nights. Nevertheless it seems improbable (although just possible) that the results depicted in the graph are due only to chance. It may now be taken as proved by the above experiment and by those of KNOTT (this Bulletin 1936 Vol 33 p 129) and of the reviewer (this Bulletin 1941 Vol 38 p 147) that microfilariae of *L. loa* and of *W. bancrofti* can live in the blood of a fresh non-immune subject for four to eight days: whether they can live equally long in a patient who must have developed some degree of immunity reaction to them is unknown but it seems likely since microfilariae of the *persians* or *repens* type can live for over two years. The observations recorded in the above graph make it highly probable that such surviving microfilariae exhibit diurnal periodicity: i.e. the periodicity depends upon the microfilariae plus the host and not upon cyclic parturition by the adult females as suggested by LANE and O'CONNOR. However the question cannot yet be considered as completely proved and further evidence is desirable.] F. Hawkin

- i VAN DEN BERGHE (Louis) Recherches sur l'onchocercose au Congo Belge. Ier mémoire. La transmission d'*Onchocerca volvulus* par les Simuliidae. [Researches on Onchocerciasis in the Belgian Congo. First Memoir. The Transmission of *Onchocerca volvulus* by Simuliidae.—Ann. Soc. Bel. de Méd. Trop. 1941 Mar 31 Vol 21 No 1 pp 63-76 With 5 figs on 3 plates]
- ii — Recherches sur l'onchocercose au Congo Belge. IIe mémoire. Les vers adultes et leur localisation chez l'homme. [Second Memoir. The Adult Worms and their Localization in Man].—*Ibid.* June 30 Vol 21 No 2 pp 167-187 With 2 figs on 1 plate [27 refs.]
- iii — Recherches sur l'onchocercose au Congo Belge. IIIe mémoire. Les aspects cliniques de l'onchocercose humaine. [Third Memoir. The Clinical Aspects of Human Onchocerciasis].—*Ibid.* Sept 30 Vol 21 No 3 pp 261-291 With 3 plates [Numerous refs.]

The three papers give a detailed review of the literature of this complex subject with accounts of the author's researches and their

bearing on the results and conclusions of other workers. A summary can note only the salient points and must necessarily leave out most of the interesting discussion which must be read in detail if it is to be fully appreciated.

The author worked in 1936 in various regions of Uele near Buta Titule Niangara Dunga and Faradje.

1 The first memoir points out that nobody has yet proved that *Simulium* can transmit *Onchocerca volvulus* from man to man. BLACKLOCK found larvae of *O. volvulus* in the midgut of 2.6 per cent of 78 specimens of *S. damnosum*. VAN DEN BERGE found microfilariae in the thoracic muscles of rather more than 1 per cent of 1320 specimens of *S. damnosum*. A higher percentage of larvae was found in the midgut of *Simulium* captured on men harbouring many dermal microfilariae and after some hours there was an increased number of larvae in the thoracic muscles. The author agrees with Blacklock's view that in so far as experiments with wild flies can be accepted as evidence in the absence of actual transmission to man and animals *S. damnosum* is a vector of *O. volvulus*.

S. damnosum seems to be the dominant species biting man in the Belgian Uele. *Simulium* in some parts of Uele live under ecological conditions identical with those found in Guatemala. These conditions and the biology of the larvae of *Simulium* are described. The distribution of the larvae and adults in Uele is indicated. The adults are found most easily near rapidly running rivers and streams; the females bite especially in the morning between 6 and 8 o'clock, as well as in the evening; they avoid bright light and great heat and will bite in the shade at all hours of the day. After rain they were found as far as 500 metres from the river Buma. The biology of African *Simuliidae* is similar to that of the American species but the African species differ in one important particular—they bite low on the body, usually lower than 1 metre above the ground, whilst the American species bite on the head and upper parts of the body, usually higher than 1 or 1½ metres above the ground. Small boys of 10 years were used as collectors of flies, each having another boy who caught the flies in tubes while they were in the act of biting. The bites on these boys were when the boys stood upright, most frequent on the ankles and legs, usually below the knee; when the boys squatted as the natives often do for various purposes the bites were on the thighs, legs, hips, thorax and even the head, but children put upright on a table escaped almost completely, although children put on the ground beside the same table had numerous bites on their ankles and legs.

There seems to be a relation between the position of the bites and the situations of the adult worms in man; this is discussed in the second paper.

The degree of infestation of *Simulium* in Uele seems to be higher (Titule 18, Ekwankatana 13.3, Niangara (R. Gada) 8.5, Niangara (Uele) 7.3 per cent) than that in Guatemala (5 per cent). It approaches the degree of infestation in Uganda (14 per cent) but does not reach that recorded elsewhere in the Belgian Congo (33.3 per cent at Kasai).

A list of the 20 species of *Simulium* known in the Belgian Congo is given.

Three types of larva found in the blackflies are described: (1) Dermal larvae from the skin, very mobile, 200–300 by 5–8 μ , easily recognized in the intestine of the fly. (2) Little sausage forms, very refractive, 200–300 by 26 μ in the thoracic muscles. (3) Larvae like (2) but more

ender found in the thoracic muscle and mouth parts 350-450 by 17 μ the so-called infective larvae these are exceptional in the mouth parts. The author does not think that more than these three forms can be recognized. The dermal forms in the gut of the insect were always rare in 1945 dissection, possibly because the flies were collected from subject not infected with *Onchocerca*. The differentiation of infective and little sausage forms seems to the author to be analogous to the differentiation of sporozoites and sporozoite in *Anopheles* and not to be useful for the establishment of degrees of infestation of Simuliidae. Little sausage forms are evidence of recent infestation and the percentages of these were high at Ekwankatana and Titule where onchocerciasis is especially prevalent. The high degree of infestation and the impossibility of avoiding bite render prophylaxis an insoluble problem.

ii. The second memoir begun with the history of the genus *Onchocerca*.

The author has demonstrated for the first time the presence of adult female of *O. volutus* in full reproductive activity outside the nodules. These were found at post mortem examination in two men at Buta in Lower Uele. One man aged 60 had one unencapsuled female in the adipose connective tissue of the right trochanteric region—a photograph of the worm and its surrounding tissue is given. In this man fragments of disintegrating *Onchocerca* were found in three other nodule partly caseous in the pelvic region; fragments of another worm were removed from the fibres of the fascia lata of the right thigh.

The other man aged 25 had a similar adult female in the connective tissue of the left trochanteric region. Living and adult *Onchocerca* were also found in three nodules in the pelvic and costal regions.

In 1904 individual examined in Uele 66.3 per cent had dermal microfilariae 61.2 per cent had nodules. The excess of those with dermal larvae can perhaps be largely attributed to larvae derived from free adult worms not encapsuled—these cannot be detected even by the most careful palpation.

The bearing of this discovery of free unencapsuled adult worms in the tissue of man on our view about the localization and migration of adult *Onchocerca* is discussed at some length. There is little experimental evidence on these questions, because *Simulium* bred in captivity do not bite captured wild ones bite man only irregularly and no suitable experimental animal is known. Experiments on man are difficult if only because in Uele every individual is under suspicion of infestation. Blacklock and the author tried unsuccessfully to use monkey and chimpanzees.

The practice of wearing pelvic girdles of various kinds and in America tightly fitting straw hat may help to determine the low sites of bites in Africa and the high sites in America but these factors should not be given too high a value as contributory causes of the sites of the nodules. The low migration of the larvae and the connective tissue reaction of the host will stop the migration and the larvae will be arrested at the osseous planes nearest to the bites—constrictions by girdles and hat brims may help this. In Africa the flies bite low and nodule containing the worms are also low down on the body in natives who wear few clothes. In negroes in Uele 87.9 per cent had low nodules (knee, sacrum and especially the trochanters and iliac crests) 10.6 per cent had them at middle height (vertebral column, elbows and knees) while 1.3 per cent had them high on the body (shoulder and

cranium) In Europeans on the other hand nodules were more often at middle height (14.2 per cent pelvic and trochanteric) or high up (37.5 per cent) This fact seems to be associated with their clothing The predominance of high sites of nodules in America seems to be associated with the fact that the flies there bite even naked persons on the upper part of the body the ocular complications of the disease may also be associated with this predominance of the highly situated nodules (see third paper)

The histology of the nodules is discussed Five categories are established according to the nature of the material withdrawn from them with a needle (1) Nodules with eggs liberated by damage of the contained female by the needle (2) Nodules with few larvae and no eggs (3) Nodules with greenish syrupy or caseous pus without eggs or larvae (4) Cold abscess full of pus and sometimes the cuticular remains of worms (5) Fibrosed nodules without eggs larvae or pus

Puncture was carried out in 405 nodules found among 582 individuals 240 belonged to category 1 125 to 2 28 to 3 7 to 4 and 5 to 5 These five categories express the process of degeneration of the worms in the nodules which may be formed around one two or several worms The worm is sooner or later destroyed the nodule is usually fibrosed and calcification follows but a purulent focus may form (cold abscess) followed by spontaneous fistula formation leaving scars which are frequent in the trochanteric region (see third paper)

iii The third memoir discusses the little known general manifestations of onchocerciasis Eosinophilia varied in the author's cases from 15 to 35 per cent Early signs are not noted by the natives and have not been seen in Europeans In Africa and America some swelling of the face coppery shine of the skin and appreciable cachexia have been ascribed to the disease but these may well be due to other causes Local signs round the nodule are allergic in nature Intradermal nodules often escape observation because they are very small they are often only identifiable microscopically Fibrosis caseation and calcification go on without any marked clinical signs The cold abscess alone causes pain loss of function and fistula formation which leaves scars common in the trochanteric region The nature of the so-called juxta articular nodules is discussed the author emphasizes the facts that they are rigorously symmetrical in their distribution and are extremely hard and almost impenetrable by a needle they contain a uniform fibrous tissue the author thinks that they are not due to *Onchocerca*

Cutaneous manifestations of the disease are discussed it is difficult to connect them with certainty with *Onchocerca* in a district like Uele where almost the whole population is infested They are never pathognomonic prurigo may be due to other causes e.g. *Loriosa* and *A. persians* or may be anaphylactic and related to some unknown antigen The author observed some cases of papular dermatitis pachydermy and lichenification from which all filarial origin seemed to be excluded His experience in Uele led him to conclude that the terms filarial itch and cutaneous onchocerciasis are not justified by experimental observations he discusses his reason for this view

Less controversial are ocular manifestations (irido-cyclo-choroiditis punctate keratitis and pannus according to the ophthalmologist HISSERTE [see this *Bulletin* 1938 Vol 35 p 767]) in patients with cranial nodules (the percentage of which is low in Uele) and in patients with microfilariae in the conjunctiva Statistical returns of the

incidence of ocular onchocerciasis cannot be compiled because the doctor attracts to himself blind people eager for cure and villages lose part of their young men who go to work elsewhere in mines and plantations. The author thinks that there is nothing to distinguish the American species *O. caecutiens* from *O. volvulus*.

The views of earlier workers on the ocular manifestations are discussed at length. The author himself examined only patients with nodules and with and without eye troubles and blind people (those who could not count the fingers of one hand at a distance of 1 metre) with and without nodules. Strips of the conjunctiva were examined for larvae. Out of 37 such patients 28 of whom were blind 12 of the blind had conjunctival larvae and they alone could be considered as suffering from ocular onchocerciasis. 6 of them had cranial nodules (on the left or right mastoid) in 5 of them the eye on the same side as the nodule alone had larvae in the 6th both eyes had larvae. The author thinks that the nodules seem to influence the eyes in this respect. The six blind people without cranial nodules had thoracic or pelvic nodules and may have had small impalpable ones higher up or free unencapsulated worms.

Nine patients with cranial nodules (two on the forehead and seven on the mastoid) had little or no ocular lesions one of the seven was a child of two years. Larvae were found in the conjunctiva in only one of them and only in one eye which was otherwise intact. Of the eight patients without larvae two had not very characteristic punctate keratitis with normal pupil iris and reflexes. The blindness of the 16 without cranial nodules was perhaps due to causes other than onchocerciasis.

Lumbar puncture in the 12 blind cases revealed larvae in only one but the author concluded that the larvae had come from the skin and not from the cerebro-spinal fluid. Lumbar puncture in 20 control cases yielded larvae only from the skin through which the needle entered. The author thinks that in all reported cases of larvae found in the cerebrospinal fluid the larvae really came from the skin at the site of the puncture.

Affections of the lymphatic glands also give rise to controversy. Their aetiological connexion with onchocerciasis is not firmly established (cf. RODHAIN below). Adult *O. volvulus* are not endolymphatic like *W. bancrofti* only their larva penetrate the lymphatic glands.

Elephantiasis in Uele is chiefly genital and may reach considerable proportions it may also occur on the leg but is never well developed there. The genital form often occurs together with nodules of onchocerciasis but the geographical distribution of the two does not coincide. In 26 cases of genital elephantiasis examined by the author only 11 had microfilariae without heaths.

A new form of larva is described which was found alone in two cases and associated with larvae of *O. volvulus* in four others. It is possibly a third form of the larva of *O. volvulus* or the larva of a new species. It had no sheath measured 380-450 by 9-11 μ and its posterior end was bent twice at right angles so that it has the shape of a hayonet this shape was preserved during its figure-of-eight movements.

The larvae of *W. bancrofti* are not found in the nocturnal blood at several places in Uele. Larvae of *O. volvulus* are rare in the peripheral blood. The author agrees with DUBOIS that the intervention of *O. volvulus* is not necessary to cause African elephantiasis although this

parasite may favour its causation. Affections of the glands and elephantiasis in Africa are often due to causes other than onchocerciasis. Clinical diagnosis of nodular onchocerciasis is not difficult. Differential diagnosis is discussed. Surgical removal of the nodules or of groups of nodules is better than the injection into them of substances designed to kill the worms. Removal of cranial nodules is said to improve the ocular complications. But removal may fail doubtless because of the existence of impalpable nodules or of unencapsuled adults and because the larvae are long lived. An enormous reservoir of the parasites exists in man, buffalo and antelope. Simuliidae cannot be eradicated and their bites cannot be avoided. Clothes are man's only means of partial protection. *G. Lapage*

RODHAIN (J) Un cas d'onchocercose avec polylymphadenopathie chez l'Européen [On a Case of Onchocerciasis with Generalized Lymphadenitis in a European]—*Ann Soc Belge de Med Trop* 1942 Mar 31 Vol 22 No 1 pp 11-17 With 1 fig

In an earlier paper [this *Bulletin* 1916 Vol 7 p 314] the author had expressed the opinion that *Onchocerca volvulus* could play a part in the aetiology of enlargement of the cervical lymph glands when the glands were rather hard and yielded by aspiration with a needle a yellowish syrupy fluid which only exceptionally contained trypanosomes but quite often contained microfilariae of *O. volvulus*. He notes that VAN DER BERGHE [above] insisted on the lack of experimental proof of the actual relation between *O. volvulus* and such enlarged glands and agrees that he is right but thinks a description of the following case is of interest in this respect.

A man aged 39 had first stayed in the Belgian Congo from 1923 to 1927 and had then been in hospital suspected of severe malaria. He had then done two terms of service at Ekwanakatan where van den Berghe found that 13.3 per cent of Simuliids were infested with *O. volvulus* and that 90 per cent of the people examined had *Onchocerca* nodules. In 1937 the patient went back to Belgium and began to complain of nervous and physical exhaustion after a course of atabrin and quinoplasmin. On the basis of an eosinophilia a doctor diagnosed filariasis and prescribed sulpharsenobenzyl. Rodhain found him robust and well nourished with a complaint of general fatigue, inability to fix his attention and insomnia. The heart, lungs, liver, tendinous and ocular reflexes were normal. There was very variable enlargement of the lymph glands in different regions. The lateral cervical glands were palpable and hard; it was possible to puncture only one of those on the right side; axillary, popliteal, epitrochlear, crural and inguinal glands were also enlarged. No trypanosomes were found in centrifuged blood or by gland puncture and the cerebrospinal fluid was normal. Puncture of the cervical glands revealed no microfilariae but microfilariae of the *O. volvulus* type were found in the inguinal glands and in the para-axillary gland in yellowish syrupy pus. A search for *Onchocerca* nodules revealed a small one about the size of half a pea in a very inaccessible position below the upper border of the right anterior iliac crest. With great difficulty a minute drop of fluid was aspirated from this hard nodule but no filarial eggs or larvae were found.

The skin was normal except for slight thickening in the lumbar and crural regions. Biopsy of small pieces of lumbar skin revealed small numbers of microfilariae in the skin with perivascular infiltration with lymphocytes and plasmocytes like that which occurs in pruriginous area. The blood showed 33 per cent of eosinophils. Faecal examination revealed only *Ertamorba coli*.

The eyes were clinically normal but in the right eye the ophthalmologist found five or six and in the left eye one irregularly rounded infiltration, without vessel in the corneal tissue. The patient had no complaint to make about his eyes. There was no trace of superficial punctate keratitis.

There seemed, after this thorough examination to be no cause other than the microfilariae to explain the enlargement of the glands. Their hardness, indicating that some sclerosis had occurred also favoured this explanation. The blood examination and the patient's general condition excluded Hodgkin's disease and lymphoid leukaemia. It seemed difficult to admit that the microfilariae found in two out of three glands punctured and in the biopsied bits of skin could explain the whole condition and the author thinks that there must have been other hidden nodules or non-encapsuled adult *Onchocerca* [cf VAN DER BERGHE above]. The fact that no microfilariae were found in the cerebrospinal fluid is emphasized.

G. Lapeere

СМЕРТНОСТЬ (N. P.) Immunité dans les hémithoses. I. Immunité des souris blanches vers une superinvasion par le *Trichocephalus muris* [Immunity in White Mice to Superinfection with *T. muris*].—*Med. Parazit. & Parazit. Dis.* Moscow 1940 Vol. 9 No 3 [In Russian pp 242-253 With 2 figs (18 refs.) French summary pp 253-254]

DEFICIENCY DISEASES

NICOL (R.) Sur douze cas de beribéri observés à Brazzaville. [Twelve Cases of Beriberi in Brazzaville].—*Re. Sci. Méd. Pharm. et Biol. d'Afrique Française* Brazzaville 1942 Juilr Vol 1 No 1 pp 81-91 [2 refs]

ALE ANDRI (H.) PALAZUELOS (P. Garcia) & LERNER (J.) La pelagra del adulto en Santiago de Chile (consideraciones sobre 110 casos). Adult Pellagrins in Santiago de Chile.—*Rev. Med. de Chile* 1942 Juli Vol 70 No 7 pp 498-506

The 110 cases analysed by the authors were seen by them during the period 1934 to 1941. Of the total 93 were men 17 were women. 35 came from rural district, 68 from urban (the residences of four were not known). As regards aetiology the authors divide their cases into four groups: (1) Endemic pellagra due primarily to defective alimentation 29 patients, 15 of them from rural district, and 14 of these were women. (2) Alcoholism 60 cases all in men 13 rural [not 113 as stated and 44 urban three not determined]. (3) Secondary to organic disease 12 patients, three of them women. The primary or associated conditions were pulmonary tuberculosis, cirrhosis of the liver, cancer or some lesion of the alimentary tract other than pellagra. (4) Mixed

nine patients all men. By mixed the authors imply the coexistence of pellagra with alcoholism or some organic disease [the distinction from group 3 is not clear].

There were 29 deaths among the 110—three in group 1, 14 in group 2. In three of these pellagra was not believed to play any part in bringing about the fatal issue: for one died of haemorrhage due to hepatic cirrhosis and in the other two the pellagral symptoms had disappeared entirely. There were six deaths in each of the other two groups. Of these five had cancer, one the ano-rectal syndrome of lymphogranuloma inguinale, others had pulmonary tuberculosis, multiple liver abscesses or chronic colitis.

As regards age, 14 were in their third decade, 30 in the fourth, 29 in the fifth, 24 in the sixth, 10 in the seventh and three in the eighth. Patients came to hospital much more in the hot months: November 15, December 20, January 16, February 14, that is 65 (59 per cent) of the total in these four months. The clinical picture is described but does not depart from the known characters. Gastroscopy was carried out in 44 cases and in 38 there was gastritis atrophic in many. Twenty-three were tested for porphyrinuria and this was present in 19 in amounts far in excess of the normal. *H. Harold Scott*

KRUSE (H. D.) The Lingual Manifestations of Aniacinosis with Especial Consideration of the Detection of Early Changes by Biomicroscopy—*Milbank Memorial Fund Quarterly* 1942 July Vol 20 No 3 pp 262-289 [62 refs.] [Summary appears also in *Bulletin of Hygiene*]

This is a preliminary report of observations of the tongue changes in aniacinosis (nicotinic acid deficiency) as seen naked-eye and with the biomicroscope. Forty-nine adults, none of whom regarded himself as sick, of varied races and from a low income group were examined. All had gross or microscopic lingual lesions characteristic of aniacinosis and detailed descriptions of the various stages are given. In the evolution and recession of its specific lesions there is a likeness to the behaviour of the lesions in avitaminoses A and C and in ariboflavinosis; all four diseases reflect a definite biological pattern. The process, whether acute or chronic, mild or severe, follows precise stages. An acute process is often superimposed on a chronic one. A system has been devised by the author of appraising the condition of the tongue in aniacinosis which takes into account the form, intensity and stage of the pathological process. After oral nicotinamide therapy (200 mgm daily for 14 months) to 15 of the patients the lesions in three have almost disappeared while the initially more severe lesions of the remaining 12 are markedly regressing. The control groups receiving either 500 mgm of ascorbic acid or 100,000 I.U. of vitamin A showed no improvement. The long period required for complete recovery is a striking feature. It is concluded that the described method of examination of the tongue is a convenient and reliable method of detecting aniacinosis. *H. N. Green*

HELLWIG (C. Alexander) & FORMAN (Louis H.) Pellagra and Internal Secretions—*Amer J Clin Path* 1942 Apr Vol 12 No 4 pp 210-217. With 2 figs. [16 refs.]

A detailed description is given of the autopsy findings in a rapidly progressive case of pellagra in a 38-year-old coloured female. Attention

is drawn to the adrenal glands which displayed atrophy of the zona glomerulosa and complete loss of lipid in the cortex. The anterior lobe of the hypophysis was also atrophied while in the pancreas the islands of Langerhans were hypertrophied.

Previous published necropsy finding of atrophic adrenal changes in pellagra are reviewed and it is concluded that the available evidence suggests a relationship between the pellagra preventing vitamin and the hormone of the adrenal cortex.

L. J. Davis

SPRUE

HANES (Frederic M.) Diagnostic Criteria and Resistance to Therapy in the Sprue Syndrome.—*Amer Jl Med Sci* 1942 Sept Vol 204 No 3 pp 436-443

This article is of the nature of a clinical lecture and a very good one. The author begins by stating categorically the chief features of the sprue syndrome under which head he includes coeliac disease and prue tropical and non tropical. The features on which he relies for diagnosis are (1) Steatorrhoea the dried stool containing up to nearly 50 per cent of fat (he does not mention anything as regards the relative amounts of neutral fats and fatty acids on which reliance used to be placed) (2) Loss of weight (3) Low glucose tolerance curve a rise of less than 40 mgm per 100 cc of blood after taking 1 gm of glucose per kilo body weight (4) Anaemia of the macrocytic hyperchromic type (5) Hypo- or achlorhydria (in 70-80 per cent of cases). Other symptoms mentioned but not stressed are the stomatitis and glossitis, meteorism etc. On these criteria diagnosis may have to be made from pernicious anaemia multiple avitaminoses pancreatic disease anorexia nervosa tabes mesenterica gastro-colic fistula and Simmonds's disease.

The author then quotes four cases in patients who in spite of intensive treatment along the lines usually attended with marked success failed to respond. No cause could be found for this lack of response. One patient improved and relapsed the other three died. Although post mortem examinations were carried out on two of these no satisfactory explanation of the proximate cause of death was discovered.

H. Harold Scott

RODRIGUEZ OLLEROS (A.) Gastric Similarities and Differences between Tropical Sprue and Pernicious Anemia.—*Ame Jl Digestive Dis* 194 Aug Vol 9 No 8 pp 261-64 [79 refs]

See this *Bulet* 1 194 Vol 39 pp 480-715

HAEMATOLOGY

BRAVE (P. D.) & BOPAIYA (N. S.) Diet Surveys and Investigations of Haemoglobin Levels in Coorg.—*India Jl Med Res* 1942 Jan Vol 30 No 1 pp 53-59

Coorg province lies to the west of Mysore in Southern India. It is an unhealthy area owing to the prevalence of malnutrition of malaria

and of ankylostomiasis. In 1940 the authors undertook a dietary survey in Mercara the principal town and the villages of Kadagadal and Igodulu. In all three the diets were those usual for poor rice eaters in India. The rice is eaten raw or parboiled in which much of the pericarp is retained. Pork and fish are also taken but the amount of flesh food consumed is small. Among school-children nutrition was poor and underweight general. 38 per cent showed pityriasis, 7 per cent angular stomatitis. Both the children and the adults showed obvious anaemia. Of 455 children examined nearly half (204 or 44.8 per cent) had enlarged spleens and in some villages the spleen rate was 79 per cent. Haemoglobin estimation of several groups of children was made the Hellige instrument being used and the findings are given in grammes per cent. Among 302 children in three Mercara schools the average of haemoglobin was 10.6 gm per cent. In a group of 60 at Madapur it was 9.67 gm. Ferrous sulphate tablets 2.5 grains each were given two daily on 40 days in two months to 96 children in a Mercara school. 91 in another school being observed as controls. Thirty-two in the former and 28 in the latter had enlarged spleens. At the beginning of the experiment the average haemoglobin was 10.63 and 10.59 gm respectively and at the end 11.2 and 10.4 gm; i.e. the one had gained 0.6 gm while the other lost 0.2 gm. To another group of 22 four tablets were given. 23 others acting as controls. The Hb at the beginning was 9.6 and 9.7 respectively at the end 10.82 and 9.98 respectively—gains of 1.1 and 0.3 gm.

The haemoglobin was also estimated in 150 pregnant women nearing term. Their average was 8.16 gm per cent whereas of 38 non pregnant women it was 10.13 gm. Fifty-two of the former had a value below 7.7 gm which NAPIER regards as indicating anaemia in pregnant women. In 23 it was below 5 gm. There were fewer cases of severe anaemia among primiparae than among multiparae: five out of 34 primiparae, 16 of 33 2 para, 10 of 19 3 para, 14 of 34 4 para and 8 of 30 5 or 6 para were anaemic.

H Harold Scott

DE MENDONÇA (João Maia). Meniscocitemia—sua frequência no Brasil. Primeiros resultados calculados em 1 045 pesquisas [Sickle-Cell Anaemia. Its Frequency in Brazil]—*Brasil Medico* 1942 Aug 8 Vol 56 No 32 pp 382-384. With 2 figs.

Facts calling for explanation in this condition are (1) Its almost complete restriction to negroes (2) Its being a constitutional defect—here dietary and familial (3) Its rôle in causing anaemia (4) Its existence in some persons in a latent form not associated with anaemia (5) Factors which transform a sickle-cell carrier into a case of meniscocytæmia that is a person with the condition in the latent state into one with genuine sickle-cell anaemia.

The first only of these points is dealt with in this contribution. The author examined 1 043 persons [not 1 045 as stated in the title and in the text] mostly soldiers round about the age of 20 years. Of these 604 were whites (but inquiry discovered some admixture of negro blood in nearly all of them) 33 yellow skinned 238 half-castes (farodermos) and 168 blacks. Among the first there were six positive (0.99 per cent) among the second none. The third group was divided into three according as the pigmentation was slight moderate or marked. Of 127 in the first sub-section three were positive of 84 in the second there were eight and of 27 in the third two altogether 13 among the

238 or 6.43 per cent. The fourth group was similarly divided according to the degree of pigmentation, and the respective numbers were 25, 61 and 79 and the positives 2, 6 and 9 or 17 among 168 (9.4 per cent.) Percentages on these small figures are of course, not reliable as applying to larger numbers but they do serve to indicate the increase as the pigmentation deepens to the full negro type namely 7.1, 9.8 and 11.3 in the light, moderate and marked respectively. These details are shown in the accompanying table.

	No. examined	Sickle-celled	Percent age	Percentage of group
White-skinned	604	6	0.99	—
Yellow-skinned	33	0	—	—
Half-castes—				
Light	127	3	2.4	6.43
Moderate	84	8	9.5	
Marked	57	2	3.4	
Backs—				
Light	33	2	6.1	9.4
Moderate	61	6	9.8	
Marked	79	9	11.3	

H. H. old Scott

VENOMS AND ANTIVENENES

CHOWHAN (J. S.) The Role of Venom Therapy in Chronic Painful Conditions.—*J. Ind. Med. Assoc.* 1942, Aug., Vol. II, No. 11, pp. 343-347, 13 refs.

The author has been studying systematically since 1929 the pharmacological action of the snake venoms of India and either alone or with his fellow worker has from time to time reported the results of his investigation. The pain relieving action is due to the neurotoxic constituent present in all venoms but preponderating in that of the cobra. Its action is to depress the medullary and peripheral centres to paralyse nerve end-plates and to inhibit the cholinesterase enzyme. In reduced doses it will, therefore depress the higher centres and may be used for delirious states, hallucination, melancholia and hysteria and as an anticonvulsant in rhabdomyositis and painful contractures and is useful consequently in epilepsy. The analgesia following its use is central in origin, thus resembling that of morphine. The latter however exerts its effects in a very short time (10-20 minutes) persists for a few hours only and then rapidly fades. Venom, on the other hand, acts slowly and several injections are needed, but the effects may persist for weeks.

It is thought that this analgesic action of venom may be due to its supplementing the cholinesterase enzyme which counteracts acetylcholine the biochemical transmitter of nerve impulses—possibly the

venom acts as the enzyme and need not merely supplement it. A further advantage over other analgesics is that venom does not produce tolerance or lead to addiction or habit formation.

For comparison with other analgesics—sodium salicylate sodium phenobarbital cocaine hydrochloride antipyrin acetanilide dilaudid codeine hydrochloride and morphine sulphate—the author made use of the rat scrotum sensibility test and found that cobra venom in doses of 1–2 mouse units (1 mouse unit is the amount of venom which will kill a 20 gm weight of white mouse in 24 hours) is the best slowly acting analgesic and that a dose of 1 m u is the optimum initial therapeutic dose for man. It is injected intramuscularly 2–3 times a week increasing gradually to 10–20 m u doses. As it is slow to act others more rapid in action such as amidopyrin novalgin opiates or salicylates may be used to control pain in the earlier stages in cases of neuritis neuralgia sciatica fibromyositis tic douloureux arthritis and the like.

H. Harold Scott

NAIDENOVA (G. A.) & TALYSIN (F. F.) On Studying the Haemorrhagic Properties of the Venom of the *Ancistrodon blomhoffi ussuriensis* Emeljanoff in the Chicken's Embryo — *Travaux Acad. Milit. Méd. Armée Rouge U.R.S.S.* Moscow 1941 Vol 25 [In Russian pp 399–402 With 1 chart & 1 coloured plate English summary pp 402–403]

MEDNIKIAN (G. A.) On the Pharmacological Properties of the Venom of the Species *Ancistrodon halys caraganus* (Elchwald) — *Travaux Acad. Milit. Méd. Armée Rouge U.R.S.S.* Moscow 1941 Vol 25 [In Russian pp 417–427 With 9 figs (14 refs) English summary pp 427–428]

DERMATOLOGY AND FUNGOUS DISEASES

RAY (Leon F.) & ROCKWOOD (Ethel M.) Sporotrichosis Report of a Case in which it was Resistant to Treatment — *Arch. Dermat. & Syph.* 1942 Aug Vol 46 No 2 pp 211–217 With 4 figs [13 refs]

Here is reported the sixth proven case to be detected in New England. The disease is so protean in nature that demonstration of the organism is really essential to the diagnosis. This particular patient was a white woman aged 65 years. The first signs of eruption had developed about twelve months earlier as a spot on the right little finger. Thereafter gradual spread involved the forearm and arm so that examination revealed a sheeted patch over the distal third of the right forearm with wrapping round the wrist. Dusky erythema was combined with verrucous crusted and fungating circular areas. A thick white pus could be extruded from pin point sinuses. The most striking feature however was the presence of numerous infiltrated dark red granulomatous nodules scattered discretely but all roughly following the linear course of the lymphatics. The axillary glands were enlarged.

contact. The incubation is two or three days. The rash never appears within 24 hours. A paper which is most careful both clinically and in its extensive botanical observations.

Sydney Thomson

ALEMANI VALL (R.) & CASTELLÉS ESCUDER (A.) Un caso de dermatitis necrótica por el *populus nigra* y revelada por la acción de los rayos solares. Necrotic Dermatitis due to the Black Poplar Sawdust induced by the Rays of the Sun.—*Rev. Clin. Espanola* 1942. Mar 15. Vol. 4. No. 5. pp. 353-356. With 3 fig. [16 ref.]

This is a most unusual case. A man of 45 years was employed for two months or so in sawing trees in particular the *chopo* or Black Poplar (*Populus nigra*). At his work at which he had sweated more than usual he had felt some itching of the face and this increased during the night. Next day he had left the house only five minutes or so when he felt a pricking of the left hand and the eyelids. This was accompanied by a burning sensation and extended from hand to forearm and from face to neck. The lids swelled till the eyes were closed. There was oedema of the neck, petechiae of face and neck and oedema of the hands and forearm, especially the left. Systemic disturbance was comparatively little. During the next 4-5 days the lesion became worse and pustulated, then they began to heal by formation of ulcers and separation of scabs, but 10 weeks elapsed before healing was complete. The left side was more affected than the right because in his work he turned that side to the sawdust which was blown into his face during the daylight hours he was at work.

The remainder of the paper is taken up with the question of diagnosis. As with many articles in Spanish this section is mostly theoretical. For instance in the present case one is not likely to confuse an acute inflammatory pustulating lesion of the face and hand with angio-neurotic oedema with urticaria with menopausal symptoms (especially when the patient is a man, even though his age is 45) with nettlerash from eating lobster with war melanosis erythema multiforme all of which are considered in the discussion of the diagnosis of this patient. —see

H. Harold Scott

DUBOIS (A.) & BRYNSELLES (G.) Coup d'oeil sur les affections cutanées des indigènes congolais. [Skin Diseases in Natives of the Belgian Congo.—] *Ann. Soc. Bel. et de Méd. Trop.* 1941. Dec. 31. Vol. 21. No. 4. pp. 311-337. 4 refs.

HOLCOMB (Richmond C.) Pinta, a Treponematosis. A Review of Literature.—*U.S. Army Med. Bull.* 1941. July. Vol. 40. No. 3. pp. 517-522. [17 refs.]

SEASON (F. W.) & BARNETSON (J.) Histoplasmosis. Report of a Case.—*Jl. Path. & Bact.* 1942. July. Vol. 54. No. 3. pp. 299-305. With 9 figs. on 3 plates. 30 refs.

The case reported is that of a European male who was admitted to the Johannesburg General Hospital. He was suffering from a number of lesions of a nodular or ulcerative character on the tongue, gums and lips. There was enlargement of the liver and spleen while the cervical lymph nodes were palpable. Blood examined revealed a leucopenia.

with a relative polynuclear increase. There was no fever during a 12 day stay in hospital. Portions of lesions of the tongue were sectioned and showed infiltration with reticulo-endothelial cells many of which contained yeast like bodies. Growth of the organism was obtained at laboratory temperature on dextrose and maltagar with mycelium and chlamydospore formation. Satisfactory infection of laboratory animals though attempted was not obtained.

C M Henyon

KEL (J A) & LARGE (A V) Histoplasmosis of the Knee—*Jl Bone & Joint Surgery* 1942 Apr Vol 24 No 2 pp 281-290
With 7 figs

The case reported is that of a man who was admitted to hospital in St Louis U S A for a chronic and painful swelling of the left knee. Examination showed that the joint was full of fluid which on aspiration proved to be thick purulent material. There was considerable thickening of the synovial membrane while X ray examination revealed erosion of the bones. It was thought that the condition was due to a low grade pyogenic infection or to fulminating tuberculosis. Treatment brought about no improvement. Finally the limb was amputated the patient dying 10 days later from a pneumonic condition of the lungs. Examination of the affected knee showed general invasion of the tissues by large mononuclear cells containing numerous *Histoplasma capsulatum*. The exact nature of the lung condition was not determined as a post mortem examination was not permitted.

C M Henyon

BOASE (A J) [Case of Rhinosporidiosis in a Native of Uganda]
[Correspondence]—*East African Med Jl* 1941 Dec Vol 18
No 9 p 270

Boase reports a case of rhinosporidiosis of the conjunctiva in a child in Uganda. There was a flattened flesh growth protruding from beneath the upper eyelid and attached to the upper fornix by a very narrow pedicle of stretched conjunctiva. In colour the tumour was congested red with uniform pin head grey mottling. Diagnosis was made microscopically.

C H

MISCELLANEOUS

PLATEL (G) & VANDERGOTEN (V) Reflexions sur les resultats obtenus par une consultation de nourrissons au Mayombe (Congo belge) [A Consideration of the Results Obtained in Child Welfare Work at Mayombe (Belgian Congo)]—*Ann Soc Belge de Med Trop* 1940 Sept 30 Vol 20 No 3 pp 297-333 [12 refs]

For six years the authors have been engaged in child welfare work in the Mayombe district of the Belgian Congo. In this paper they provide a detailed account of their work and summarize the results obtained. The causes of child mortality are discussed and the conclusions reached as a result of an objective study of the problems are set out.

The weights of Congo children were found to be considerably less than those of children in Belgium—for example at birth 550 grammes at six months 1 400 grammes and at two years 3 000 grammes less.

The causes of stillbirths and neonatal deaths were difficult to ascertain accurately. As regards stillbirths syphilis was considered to be rare congenital malformations not especially frequent and malaria negligible. Obstetrical causes were more frequent than in Belgium owing to the lack of skilled attention. As to neo-natal mortality malaria was not considered of importance but broncho-pneumonia and malnutrition were serious the first as a result of a native custom of leaving the child exposed until the cord had separated the second owing to the difficulty of obtaining substitute food when the mother's milk was absent or deficient.

Of the mortality from the second month up to three years of age acute affections of the respiratory tract caused 50 to 60 per cent of the total deaths and gastro-enteritis 10 to 23 per cent. Malaria though hyperendemic in the district and wide spread among the children was not considered to be a major factor.

A large part of the paper consists of a critical examination of the statistics which had been published by the Foreamu organization and of the conclusions which had been drawn from them.

The authors' own conclusions are as follows. In child welfare diet and individual hygiene play a fundamental part. But advice on hygiene can seldom be followed by native mothers who find it often impossible to obtain soap pure water necessary clothing and cooking requisites. Milk and substitute foods for infant feeding are beyond the means of all but a few.

A study of the causes of the mortality and of the means of combating them show that infant welfare clinics however well equipped and run though they can lessen the sickness and suffering of infants cannot by themselves have such a decisive influence as certain statistics would appear to show.

As to those rural clinics in which the work is limited simply to weighing the baby and giving advice it is questioned whether in the present state of the colonial medical service the results justify the considerable expense which they entail.

Mary Blacklock

TROLLI (G.) A propos du travail. Reflexions sur les résultats obtenus par une consultation de nourrissons au Mayumbe (Congo Belge) par le Docteurs Platel et Vandergoten. [Remarks on the Paper by Platel and Vandergoten (above)]—*Ann Soc Bel de Med Trop* 1940 Sept 30 Vol 20 No 3 pp 371-387

Dr Trolli replies in detail to the various criticisms of Foreamu made in the above paper.

As regards the figure for stillbirths he points out some of the difficulties encountered not only in collecting such statistics in the Congo but also in making a comparison of them with those from other countries. He shows that even in Europe there is not yet agreement as to what should be described as a stillbirth. Even in Europe stillbirths and abortions are often confounded and this naturally happens more frequently in the Congo.

The author emphasizes that Foreamu has never published statistics of child mortality in a spirit other than that of getting as close to

reality as possible. He is convinced that infant welfare clinics constitute the best weapon in the struggle against infant mortality in spite of faults of organization and lack of material means at their disposal and gives figures comparing vital statistics in Belgium and Bas Congo in support of his arguments
Mary Blacklock

DENECKE (Karl) Studien ueber die inneren Krankheiten und deren Verlauf in einem westafrikanischen Hospital [Internal Diseases seen in a West African Hospital]—*Deut Trop Ztschr* 1941 Oct 15 Vol 45 No 20 pp 609-620 [11 refs]

This is an account of diseases seen by the author in Fernando Po. It does not differ greatly from the record reviewed in this *Bulletin* 1942 Vol 39 p 348
C W

KERMACK (William O) Some Recent Advances in Chemotherapy—*Edinburgh Med Jl* 1942 July Vol 49 No 7 pp 429-457 With 35 figs [35 refs]

This is a review article containing an account of the synthetic antimalarial drugs the trypanocidal drugs including the aromatic diamidines and the sulphonamides
C H

SORICELLI (Filippo) Quadra radiologica della tubercolosi polmonare negli Eritrei [X ray Appearances in Pulmonary Tuberculosis of Eritrean Natives]—*Boll d Soc Italiana di Med e Igiene Trop* (Sez Eritrea) Asmara 1942 Vol 1 No 2 pp 27-33 [12 refs] English summary

JAGUJINSKAIA (L W) Présence d'une membrane peritrophique dans l'estomac de la femelle adulte d'*Anopheles maculipennis* [Presence of a Peritrophic Membrane in the Stomach of Female *A. maculipennis*]—*Médec Parasit & Parasitic Dis* Moscow 1940 Vol 9 No 6 [In Russian pp 601-602 With 2 figs French summary (8 lines) p 603]

It is usually stated that the adult mosquito has no peritrophic membrane. There is however an exceedingly delicate pellicle between the blood and the stomach wall and the author claims that this is composed of chitin (like the peritrophic membrane of other insects) and that it is in fact a true peritrophic membrane. This sheath is formed anew at each feed and the remnants discharged through the anus. It may form a complete sac around the blood but is often open posteriorly. It is absent in the unfed or newly emerged mosquito
P B Higglesworth

SOUTH AFRICAN INSTITUTE FOR MEDICAL RESEARCH ANNUAL REPORT FOR YEAR ENDED 31st DECEMBER 1941 [CLUYER (E H) Director]—pp 18-20 Mosquito Repellents

Laboratory experiments with *Aedes aegypti* in which a number of repellents were tested showed that the following solution when applied

to the arm maintained a repellent action for 3-4 hours and when praved on to a guinea pig, repelled for 5 hours —

Citronella	88 part
Coumarin	7
Gum benzoin	5

There is no irritating action on the skin and the smell is not objectionable. Coumarin as a 20 per cent solution in spirit or in the same strength in Cello-solve (ethylene glycol monoethyl ether) was equally effective.

A repellent must be applied thoroughly to all exposed parts of the body. It is more effective in cold than in hot weather probably because of dilution by sweat in the heat. These laboratory experiments could not reproduce the conditions existing in nature and it remains to be seen if the repellents are active in the field. C. H.

SERGEANT (Et.) Sur l'action culicifuge de certains produits. [Mosquito Repellents — *Arch. Inst. Pasteur Alger* 1940 Vol 18 No 4 pp 461-463 Summary taken from *Rev. Appl. Entom.* Ser B 1942 Oct Vol 30 Pt 10 pp 150-151]

In experiments to determine the value as mosquito repellents of a mixture of 12 parts oil of eucalyptus, three parts oil of citronella and one part naphthalene which is stated to be commonly used against lice and an extract of the leaves of *Melia aegyptiaca* which is used against locusts, 2332 adults of *Aedes albopictus* L., *Anopheles maculipennis* var. *labranchiae* Fini and *Culex pipiens* L. were used. Of these 1175 bit twice. A hand was exposed for five minutes to mosquitoes that had been kept without food for several days and was withdrawn before they could engorge. It was then treated with the product to be tested and exposed for a further five minutes to the mosquitoes after a resting interval. The number of mosquitoes that bit on the first and second occasion were compared. The effect of each of the components of the mixture on each species of mosquito was analogous with that of the mixture itself. The latter began to lose its repellent effect to *Aedes albopictus* after about 30 minutes and had lost it completely at the end of 90 minutes. The repellent effect to *Anopheles labranchiae* began to decrease after one hour but was still apparent after four while that to *Culex pipiens* began to decrease in some instances after 30 minutes but in others was still apparent after nine hours. The effect of the extract of *M. aegyptiaca* was so weak that it is considered to offer no protection as a mosquito repellent.

DE MEILLON (B. th.) Estudos entomológicos da colônia de Moçambique [Entomological Studies in Mozambique]—31 pp. With numerous illustrations & folding maps. 1941. Lourenço Marques. Estação Anti Malarica. [Imprensa Nacional de Moçambique.] Guia para a identificação dos anelinos da Colônia de Moçambique com nota acerca dos seus hábitos. Luanda. 1941. pp 137-313. With 11 figs. (47 refs.)

JELLI ON (Wm L.) & GOOD (Nell E.) Index to the Literature of Siphonaptera of North America.—*Ann. Ent. Soc. Amer.* 1942. 193 pp. [Bibliography.]

LUCAS (Thomas L.) Poisoning by *Megalopyge Opercularis* (Puss Caterpillar) — *Jl Amer Med Assoc* 1942 July 11 Vol 119 No 11 pp 877-880 With 6 figs

The moth is found in the Southern United States. The larvae of this and similar moths are equipped with straight sharp hollow spines filled with a fluid which presumably causes the symptoms which arise after penetration of the human skin by these spines. The author describes one case seen by himself and three recorded in the literature. After contact of the skin with the larva there develops within a few minutes pain burning and itching with erythema and vesiculation rather like the symptoms experienced after contact with nettle. General symptoms also occur and may be severe with excitement, alarm and restlessness, headache and muscle cramps. Symptoms may be relieved by the use of codeine or even of adrenalin. They disappear after about 12 hours. The area of the injury heals much as a burn of the first degree heals. [See also this *Bulletin* 1923 Vol 20 p 801] 1937 Vol 34 p 733

SMITH (Clarence D.) & ROSENBERGER (Randle C.) A Case of Cutaneous Myiasis due to the Larvae of *Cordylobia anthropophaga* — *Amer Jl Trop Med* 1942 July Vol 22 No 4 pp 459-461 With 3 figs

GLAUBACH (Nathan) & GULLER (E. J.) Pneumonia apparently due to *Trichomonas buccalis* — *Jl Amer Med Assoc* 1942 Sept 26 Vol 120 No 4 pp 280-281

The patient was admitted to hospital with signs and symptoms of left lower lobar pneumonia. The cough was productive of a white frothy phlegm with complete absence of blood. Bacteriological examination of the sputum failed to reveal any pneumococcal infection but microscopic examination disclosed many trichomonas. Examination of scrapings from the gums and around the teeth which revealed in advanced pyorrhoea did not show any of the flagellates. Faecal examination was likewise negative for trichomonas though amoebae containing red blood corpuscles were discovered. There was no history of dysentery. Treatment of the pneumonic condition with sulphadiazine had been commenced early on and this was continued as recovery took place. The amoebic infection was less numerous and finally disappeared. The amoebic infection was eradicated by a course of carbarsone. It is admitted that it cannot be stated whether the trichomonas was the cause of the lung condition or whether it was merely a secondary invader.

C. M. Wenyon

AHMAD (Dabiruddin) Determination of the Age in Bengali Girls in Medico Legal Cases—Some Practical Difficulties. The Role of X Ray Examinations of Bones — *Indian Med Ga* 1942 June Vol 77 No 6 pp 351-355

In this paper the author reviews the methods commonly used for the determination of age. The two most important are the examination of the teeth and the X ray examination of the bones. No method is infallible and great variations exist from case to case. Two tables

are given which may be helpful but it is emphasized that account must be taken of all factors general development height weight and signs of puberty

Permanent Teeth		Age
1	First molar	6 years
2	Central incisors	7
3	Lateral incisors	8
4	Anterior bicuspid	9 (9-10)
5	Posterior bicuspid	10 (10-12)
6	Canine	11 (11-12 rarely 13)
7	Second molar	11 (11-13)
8	Third molar	17-25 (generally about 18)

Bones

Name of bone	Part of bone	Fusion of the Epiphyses		
		Earliest	Average	Latest
Humerus	Upper end	14	14-16	19
	Lower end	11	11-13	14
Radius	Upper end	1	14	15
	Lower end	12	16-17	18
Ulna	Upper end	12	15	16
	Lower end	14	16-17	18
Carpal bones	Capitate 6 months			
	Hamate 8 to 14 months			
	Triquetrum - to 3 years			
	Lunate 5 years			
	Multangular majus 5 to 6 years			
	Scaphoid 6 years			
	Pisiform 9 to 11 years			
Metacarpals	1st	13	14-16	18
	2nd to 5th		14-15	

[See also this *Bulletin* 1938 Vol 35 p 927]

C II

BOOK REVIEW

BARRTO (João de Barros) *As realizações em 1941 do Departamento Nacional de Saúde* [Report of the Department of Health Brazil for 1941]—*Arquivos de Hygiene* Rio de Janeiro 1942 Apr Vol 12 No 1 pp 7-301 With numerous illustrations & charts

To do justice to the vast amount of work recorded in this report for 1941 of the Department of Health and Education Brazil would require far more space than can be allotted to it. We must therefore limit our remarks to those matters which are of special interest to readers of this *Bulletin*. Part of the report is concerned with question

of finance and administration the former of which is entirely the latter largely of local rather than of general interest. Metc enumeration of the various sections will suffice to indicate the enormous scope of the work and the many fields of the Department's activities I Administrative Service II Health Organization III Hospital Organization IV The Oswaldo Cruz Institute V Leprosy Service VI Tuberculosis VII Yellow Fever VIII Malaria IX Plague X Mental Diseases XI Health Education XII Medical Treatment (personnel supply and costs) XIII Port Sanitation XIV Water Supply and Sewage Disposal XV Statistics And lastly brief notes of seven meetings of delegates

In the sections concerned with Administration and Organization arrangements and proposals for future work and aims are detailed for each of the States of the Republic and the estimated cost *per caput*. The following section deals in a similar manner with hospital provision

The report of the *Leprosy Section* gives details of the cost of maintenance of each of the sanatoria with numerous illustrations of them and a plan of the Sao Benito leper colony Ceara. During the year four more preventoria for the care and education of the children of lepers have been inaugurated. The leper census figures are somewhat confusing [to the reviewer at least]. In a table are given the census figures for 1941 and the total is 3 638 to which São Paulo contributes 1 536 Minas Gerais 869 and Distrito Federal 270. On the next page however is another table giving the numbers of known patients and the numbers isolated in the different leprosaria in December 1941. The known patients total 32 949 (Sao Paulo 12 350 Minas Gerais 8 434) and the numbers isolated 15 777 (or 48 per cent of the known cases) Sao Paulo with five institutions contributing 8 458 and Minas Gerais with two institutions 2 171. The number since the Service began its work (1937?) totals 47 772 (Sao Paulo 19 599 Minas Gerais 8 426 Para 4 552).

The aims and purposes of the leprosy campaign are set out at length but need not be detailed here. They include of course the discovery of cases isolation and treatment of them observation of contacts care of children institutes for study of the disease propaganda and education.

The *Yellow Fever Section* is comprehensive. Maps are reproduced showing the administration area of the Service the situations of 1 296 viscerotomy posts and of 6 667 anti Aedes Service localities. Ten years ago there were only 394 of the latter and 260 of the former. During the year 32 282 specimens of liver tissue have been examined. The good work of the campaign is evidenced by the return of positive cases of the disease confirmed by histopathological examination or isolation of the virus. The figures for the past five years have been 217 262 130 172 and 19. Serum tests for evidence of protection have been carried out in 8 807 cases.

Another section equally if not more important is that of *Malaria*. The President's decree of October 1st 1941 is reproduced in full of the 42 Articles one—the second—is worth quotation here —

The following measures are to be undertaken for combating malaria

- 1 Work of sanitary engineering and other health measures to prevent the breeding of the insect transmitters
- 2 Systematic destruction of those species of *Anopheles* as are of local epidemiological importance at some stage of their evolution

- 3 Protection of individual, and their dwellings by chemical mechanical and biological means
- 4 Isolation and treatment of patients and carriers of gametocytes to get rid of or at least reduce their infectivity
- 5 Education of the people

Several photographs are reproduced showing the developments of drainage schemes in different States and Departments of the Republic with records of examinations made in certain districts. One example will suffice. At Val de Cans in the Province of Para the larval index has been worked out month by month since October 1940. Whereas in March 1941 it was 1.5 per cent in the last half of the year the figures were 0.72 0.12 0.03 0.05 0.04 and 0.02 respectively. Case of infection notified in October 1940 numbered 894 and in December 174. A maximum of 4.2 was reached in April 1941 but in the last half of the year the figures have steadily declined from 234 in July to 98 in December.

Work done in each of the States and in various parts of each is mentioned in many cases in instructive pictures showing the drainage schemes in progress and completed are given.

Section VI of the *Plague Service* report that the plague situation in 1941 was worse than in the preceding year. One hundred and fifty-five cases were recorded in the north-east as compared with 94 in 1940 (in 1937 there were only 35). Ninety-six were in Pernambuco 47 in Alagoas and 12 in Bahia. Pernambuco and Ceara have always shown most cases. In 1934-36 the respective figures were 31 and 100 437 and 231 89 and 137. Since that year the figures for Pernambuco have been successively 23 71 33 61 and 96 whereas Ceara has been almost free (2 3 3 2 and 0 respectively) and Alagoas has taken up the running its figures for 1937 to 1941 inclusive being 0 6 40 25 and 47. The fatality rate for the whole north-east has averaged since 1935 38.5 per cent. In 1941 it was 39 per cent and in 1935 as high as 47 per cent. A projected decree to combat plague and rats is quoted *verbatim* in the report.

The numbers of rats caught and the flea index at six of the chief ports are given in a table. These are worth quoting. Maranhão 5309 rat index 10.8 in May 1.8 in October. Santo 11533 rats index 2.6 in November 0.0 in October. Fortaleza 15494 rat index 1.6 in February 1.0 in January. Salvador 16618 rat index 24.1 in October 0.05 in March. Recife 17584 rat index 6.3 in March 0.8 in September. Rio de Janeiro 53509 rats index 6.3 in October 1.0 in November.

Port Sanitary work (Section VII) has been largely concerned with rat capture and destruction and with disinfection of vessels. The other section named at the beginning of this review will not interest readers of the *Bulletin* though of much local importance such for example as water supplies (detail of cost and upkeep of which are given for many localities in the different States) sewerage installation the Federal Statistical Service and its administration. Actual statistics of birth, deaths and diseases generally are not mentioned here.

The foregoing remarks will convey some idea of the magnitude and importance of the work being carried out by the Ministry and the Health Department of Brazil.

H. Harold Scott

TROPICAL DISEASES BULLETIN

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[No 3

SUMMARY OF RECENT ABSTRACTS *

III MALARIA

Epidemiology

DRENSKY (p 602) states that in Bulgaria the chief malarial regions are found along the great rivers (Danube Maritza and Struma) and in the coastal region. In the Danube region *Plasmodium vivax* only is found on the coast and in the Struma region *P. falciparum* becomes more common than *P. vivax* in autumn and spleen rates reach 80-100 per cent. Mortality is highest in the Struma area.

The Department of Health of Palestine (p 592) describes the great reduction in malaria which has been effected since 1918. The Jordan valley is still heavily infected but many of the areas previously dangerous have been controlled with success. *P. vivax* is most in evidence from June to September. *P. falciparum* from August to December. *P. malariae* is rare.

VISWANATHAN (p 251) states that the transmission season in tea estates in Upper Assam where *Anopheles minimus* is the vector is from May to January inclusive. *P. vivax* infections are most prevalent from May to July. *P. falciparum* infections are commoner throughout than *P. vivax* but are especially seen in the last quarter of the year.

As is well known malaria in Ceylon in normal years is most prevalent in the dry zone of the north and east and is least common in the wet zone of the south west. The intermediate zone is subject to great fluctuations in spleen rates. SIVALINGHAM and RUSTOMJEE (p 663) confirm these findings and give an account of a very extensive series of examinations carried out in children. Spleen rates varied from 40-60 per cent in the dry zone to 0-10 per cent in the wet zone. In the dry and intermediate zones *P. malariae* was the commonest parasite. *P. falciparum* next and *P. vivax* least. In the wet zone the three were more evenly distributed.

TANAKA (p 251) states that benign tertian and subtertian malaria are endemic in the Yulin district of Hainan. He gives a list of the *Anopheles* found but no indication of the principal vectors.

The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin* 194 Vol 39. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

FAUST (p. 388) notes that in the United States all the naturally acquired malaria is due to *P. vivax* except in the South where *P. falciparum* is found. He discusses the distribution of malaria in the Southern States.

CARR *et al.* (p. 513) have carried further their investigations of malaria in Cuba. *P. vivax* was much more common than *P. falciparum*. *P. malariae* was not found. The association of low parasite rates with higher spleen rates is an indication that malaria has not recently been active and it is recorded that the last epidemic in the Camaguey Province under investigation occurred in 1934. The practice of importing labour for the cane harvest has been abandoned in recent years and it is thought that this has probably reduced the incidence of epidemic malaria. CARR and MELÉNDEZ (p. 514) give a similar report on the Province of Pinar del Río, Cuba, noting that malaria is most common along the coastal plain below a height of 100 feet. CARR *et al.* (p. 515) have found very little endemic malaria in the Havana Province of Cuba and attribute this to the porous nature of the soil. Breeding of *A. albimanus* takes place however on the comparatively impervious soil of the valley of the Almendares river where rain and irrigation water tends to collect and where borrow pits afford opportunity for stagnation of water in the rainy season.

RAMÍ (p. 136) gives an account of malaria in British Honduras where *P. falciparum* infections are more common than *P. vivax*. *P. malariae* is found occasionally.

KLUG and RUIZ (p. 290) have conducted a malaria survey of Costa Rica where the disease is most prevalent in the low lying provinces. *P. vivax*, *P. falciparum* and *P. malariae* are found, the latter especially along the Pacific coast. Spleen rates in children are given and are related to the parasites found. The evidence gained indicates that *A. albimanus* is by far the most important if not the only vector but a list is given of the other anophelines found.

LOBO (p. 297) states that although in Europe rice cultivation may lead to the breeding of non vector races of *A. maculipennis* and may therefore not necessarily lead to malaria, the position in the rice-fields of Argentina is quite different. There rice cultivation invariably leads to the breeding of large numbers of *A. pseudopunctipennis*, the most important vector of the Tucumán Province and malaria is greatly increased in the neighbourhood of the rice-fields. To control this malaria he advocates the exclusion of rice cultivation near villages, intermittent irrigation, the use of Paris green and prophylactic drugs and the proofing of dwellings.

NOÉ and VEGHME (p. 427) give an account of malaria in a district in the north of Chile where *P. falciparum* and *P. vivax* infections occur and where *A. pseudopunctipennis* is the vector.

Actiology

SOARES (p. 293) believes that the parasite found in pernicious malaria at São Bento, Brazil, which is markedly neurotropic, can be distinguished morphologically and clinically from *P. falciparum* and adheres to the opinion of ZIEMANN that *P. perniciosum* is a valid species. It is said to be very resistant to the usual anti-malaria drugs. FERRARI (p. 293) refers to the findings of Soares and supports his contention.

ARCHETTI (p 17) reports infections with *P. malariae* in southern Abyssinia. No *P. vivax* infections were found but *P. falciparum* was apparently present.

GARCIA (p 116) describes what is probably *P. ovale* in a patient in the Philippines. This finding recalls CRAIG's original description of a similar form in 1900 in an American soldier who returned from service in those islands. YAO and WU (p 388) describe a parasite which was probably *P. ovale* in a patient at Kunming, China. DE ZULUETA (p 809) describes *P. ovale* found in Colombia for the first time. RAFFAELE (p 263) claims that exoerythrocytic schizonts cannot originate from merozoites formed within red cells from pigmented schizonts but that they are formed from sporozoites or from merozoites of non pigmented forms within endothelial cells. [But see COULSTON and MINWELL (p 440).] In his view the fact that exoerythrocytic schizonts may follow infection induced by the inoculation of blood containing pigmented forms is due to the existence of undetected exoerythrocytic forms found in the blood inoculated. He describes and illustrates exoerythrocytic schizonts found in human malaria one from the bone marrow in *P. falciparum* infection and two from the bone marrow in *P. malariae* infection. This is the first record of these forms in quartan malaria. BRUG (p 263) claims to have found exoerythrocytic schizonts in smears of the lung from a paralytic who died and who had been treated by induction of malaria. In comment however Wenyon does not accept the finding without question.

Transmission

RUSSELL and RAO (p 427) have shown that in water in which the surface tension has been reduced from the normal 70 to 27-36 dynes per cm anopheline larvae cannot attach themselves to the surface and that they sink and drown. There was no significant difference between species and no correlation could be found between the surface tension of natural waters and the presence or absence of larvae but in natural waters no surface tension below 60.5 dynes was found. It seems from an experiment carried out by BOUD *et al* (p 431) that anophelines feeding on a person infected with two strains of *P. vivax* may become infected with one strain only or with both and in that case may be able simultaneously to propagate both strains. TOUMANOFF (p 117) discusses the composition and formation of the black spores found in some infected mosquitoes.

BATES (p 389) reports on field observations of *Anopheles* in Albania. Here intense malaria is associated with *A. maculipennis* var. *sacharovi* which breeds typically in marshes and also in pools and ditches and in water containing 2 per cent or more of sodium chloride. He discusses the factors which limit the geographical distribution of this and other varieties among which are probably the extremes of summer and winter temperatures and the variations in atmospheric humidity which affect the adults. There is reason to think that some malaria may be carried by one or more of the varieties *typicus*, *messeae* and *subalpinus* which are usually considered to be innocuous because they do not readily attack man. In the areas in which *sacharovi* is not found the principal vector is *A. superpictus* which breeds typically in the small pools of gravel river beds but which late in the season when the adult population has reached its maximum may breed in other pools and in rice fields. The other *Anopheles* found

include 4 *hyrcanus* 4 *al ciensis* 4 *plumbeus* (breeding in tree holes only) 4 *clavii* and 4 *warleri*. DRENSKY (p 602) states that in the Danube region of Bulgaria the common anophelines are 4 *maculipennis messeae* and *typicus* malaria is present but not intense. In the coastal area and the Struma region 4 *maculipennis sacharovi* (*clavii*) and *typicus* and 4 *superfictus* are found malaria is there much more intense. KOMAREK and BREINDL (p 393) found 4 *maculipennis typicus* and *messeae* and 4 *bisulcatus* (*clavii*) in Moravia and Bohemia and describe their habits.

WEYER and HUNDERTMARK (p 428) have found experimentally that there is no significant difference between the temperatures of water preferred for oviposition by 4 *maculipennis* (*typicus messeae atrofasciatus* and *latrarchiae*) and 4 *superfictus*. The experiment therefore offers no explanation of geographical distribution of these mosquitoes but it shows that water temperature is not the only important factor in the choice of breeding place.

KHODAKIN and SHTERNGOLD (p 116) record results obtained in their investigations in Tashkent on the cold resistance of 4 *superfictus* 4 *pulcherrimus* and 4 *maculipennis sacharovi*. In Tashkent 4 *superfictus* and 4 *sacharovi* usually hibernate in buildings in which the temperature does not fall below -7°C there is probably therefore no great mortality of the adult in winter. Information is given of the hatching of eggs kept for 16 hours at -4°C . RAEVSKII (p 253) has made studies on the microclimate of the winter quarters of hibernating 4 *maculipennis* var *messeae* the details must be sought in the original abstract.

The Department of Health of Palestine (p 397) have issued a review of malaria in the period 1918-1941. The common vector are described (4 *fuscatus* 4 *sacharovi* (*clavii*) 4 *sergenti* 4 *superfictus* 4 *hyrcanus* var *ensis* and 4 *al ciensis*) and in account of their breeding places is given.

HADDOW (p 393) has shown by controlled work in huts in Kenya that 4 *ambigua* and 4 *fuscatus* are true house-haunting species entering houses principally shortly before dawn preferring houses with numerous human inhabitants especially if unwashed attracted to a hut containing dirty clothing attracted but little to a calf. In this area the incidence of 4 *ambigua* depends on the local rainfall that of 4 *fuscatus* increases with rise in the level of Lake Victoria and depends therefore not on local but on general rainfall of a large part of East Africa.

BRAMBILLA (p 391) gives a list of the anophelines found near Dire Dawa Abyssinia the commonest was 4 *gambiae*. ARCHETTI (p 17) has found 4 *ambigua* and 4 *laevis* in southern Abyssinia.

DE MEILLON and PEREIRA (p 294) discuss the identification of anophelines of the *fuscatus* group in Portuguese East Africa.

HOPKIN (p 391) shows that on the northern shore of Lake Victoria 4 *fuscatus* is capable of travelling two miles down wind from its breeding place and that under these circumstances it caused extensive malaria in an institution.

BLACKLOCK and WILSON (p 253) have shown that in Freetown Sierra Leone engorged 4 *gambiae* tend to rest in shrubs during the daytime. In Java VENKLI (p 254) has made the somewhat similar observation that whereas of female 4 *maculatus* caught in houses only about one-third contained blood of those caught on the steep shadows and moist banks of the stream practically all were engorged.

VENHUIS (p 736) notes also that other anophelines especially *A aconitus* are to be found resting on the steep dark and damp banks of streams In such localities infected *A minimus* var *flavirostris* have been found whereas no infected specimens were caught in houses or stables (p 737) He emphasizes the importance of search in these and other natural haunts

GENEVRAI and TRY (p 177) report on the area of moderate malaria endemicity in the Tong area of Indo China where of the many potential vectors *A aconitus* is the most widespread

THOMSON (p 293) has continued his studies on the behaviour of *A minimus* He notes that in waters favoured by this mosquito the amount of organic matter and the degree of pollution are consistently lower than elsewhere yet gravid females do not appear to be able to distinguish water from the normal breeding place and water not ordinarily used and larvae will develop in both This subject requires further investigation On the other hand when water is polluted by decaying vegetation even in very high dilutions gravid *A minimus* are repelled clearly the sensitivity of the female is the essential factor in control by herbage packing The controlling effect usually attributed to silt in rivers is probably due not to the silt but to increase in stream velocity He (p 597) notes that *A minimus* has apparently no marked reaction to differences in humidity but has a strong tendency to avoid high temperatures The temperature fatal to adults is several degrees lower than that fatal to *A vagus* Most blood meals are taken after midnight and blood feeding takes place throughout the year there is no hibernation in cold weather

The same author (p 597) has shown that in suitable places there is a considerable output of female *A minimus* in January the coldest month of the year The breeding places at this time are in perennial rivers or seepages and small streams these must be included in any control scheme and the most convenient method probably consist of the removal of grassy edges and the exposure of the bare banks to sunlight In the period February to April there is a great increase in larval density and output of adults

VISWANATHAN (p 426) gives the results of a 10 year investigation in Assam where *A minimus* is the principal vector throughout in this mosquito sporozoites were found every month except February The other vectors are not of much importance except in localized areas *A annularis* was found to be infected in one district only *A culicifacies* similarly in one area only *A maculatus* was infected in Shillong but the malaria prevalence was low there in 1940 when the influence of *A minimus* was slight in Shillong *A maculatus* is markedly zoophilic A very few specimens of *A philippinensis* and *A aconitus* were infected they are of little importance Similar findings for the year 1940-41 are given by VISWANATHAN *et al* (p 598)

CLARK and CHOUDHURY (p 177) show that in Assam *A leucosphyrus* is a serious vector of malaria among people who live on the edge of jungle country and that in such people the malaria may be intense In these districts the mosquito breeds in small collections of stagnant water In comment Buxton points out that although it was previously known that *A leucosphyrus* was a carrier it was often dismissed as a jungle species not normally seen if not looked for The finding of the present authors may have an importance not yet realized for India Burma Malaya the Dutch East Indies and the Philippines

RUSSELL and RAO (p 599) have studied the seasonal prevalence of 12 species of Anopheles in S E Madras paying most attention to *A. culicifacies*. This mosquito is most prevalent in August-September as a result of irrigation which begins in June but afterwards the density declines for reasons which are not clear. These authors (p 599) state that the principal breeding places of *A. culicifacies* in the Tanjore District of Madras are collections of water in borrow pits but that as the pits grow older the numbers of larvae decline. This decline is associated with the increase of blue-green algae, amorphous organic matter and total plankton yet under these conditions the development of larvae is not adversely affected. If these conditions are the cause of the decline therefore their effect must be upon the egg laying females which choose the newer waters of fresh borrow pits for oviposition. Many other factors were investigated but were found to have no influence.

RUSSELL and MOHAN (p 391) have bred *A. stephensi* in tap water and from these colonies have established others which will breed in water containing as much as 80 per cent sea water. Experiments have shown that these changes in the chemical composition of the larval environment do not modify the capacity of the emerging *A. stephensi* to transmit *P. falciparum*.

SEW (p 810) enumerates the anophelines found in trains and boats arriving in Calcutta noting in particular that *A. sundaeus* is found and has probably become established in salt lakes east of Calcutta as a result of boat transport. He (p 294) has studied the relationship between 12 common aquatic plants and the same number of species of Anopheles near Calcutta. Certain species are not found in association with certain plants. The results cannot be summarized but it appears that a practical result of such studies may be that plants may give an indication of the prevalence of certain mosquitoes.

BOYD (p 429) has investigated the infecting power for *A. quadrimaculatus* of patients infected with *P. vivax*. Good infectors in general have higher gametocyte densities than poor infectors and the sexes of the gametocytes are more equal. Yet density alone is not a reliable guide to infecting power and susceptibility of mosquitoes in different batches possibly affects the qualitative infection of any batch, especially when gametocyte density is low. The gametocytes of good infectors are probably of greater vitality than those of the poor infectors.

HURLBUT and HEWITT (p 295) note that *A. quadrimaculatus* may be infected with *P. lophura* as a ran parasite and point out that in human malaria investigations oocyst and sporozoite indices are used and that confusion between infection with *P. lophurae* and the human parasites is therefore possible.

VARGAS *et al* (p 430) have shown that in a district of Mexico *A. pseudopunctipennis* is the only important vector and point out that in other regions of America where this mosquito occurs with recognized carriers such as *A. albimanus* and *A. tarsimaculatus* its importance is apt to be overlooked or uncertain. VARGAS (p 295) distinguishes four varieties of *A. pseudopunctipennis* by morphological differences in the egg. KUMBI (p 296) has noted variations in the egg of certain anophelines in Costa Rica the significance of which is not clear.

BOCALANDRO and WILDE (p 115) note that the most important and probably the sole vector in Argentina is *A. pseudopunctipennis* although other anophelines such as *A. agyris* are more prevalent.

LOBO (p 292) notes that *A. pseudopunctipennis* is the important vector in the Tucuman Province of Argentina. ROMANA (p 292) states that *A. albistarsis* is believed to be a vector in the Chaco territory of the same country and is a predominant species. Both authors give lists of other prevalent anophelins.

CARR *et al* (p 513) note that in the Camaguey Province of Cuba *A. albimanus* is the important vector and that *A. crucians* and *A. vestitipennis* are found. *A. albimanus* is found especially at altitudes below 100 feet along the coastal plain (p 514). It is not common in the porous soil of the Province of Havana except in the valley of the Almendares river where relatively impervious soil offers opportunity for collection of irrigation water and the formation of pools in borrow pits during the rainy season (p 515).

KOMP (p 430) notes that *A. darlingi* a dangerous vector has recently been found in British Honduras, Guatemala and Spanish Honduras. It had previously not been seen north of Venezuela. KUMM and RAM (p 296) and RAM (p 736) note that in British Honduras *A. albimanus* is the commonest anopheline. *A. darlingi* is found in restricted areas. One naturally infected specimen of *A. vestitipennis* was found, an interesting finding in view of the fact that this mosquito is not usually regarded as a vector.

CORRÊA and RAMOS (p 737) report infected *A. darlingi* and *A. oswaldoi* var *metcalfei* in the south of the State of São Paulo. COUTINHO (p 738) also reports infected specimens of the latter in Brazil.

ROZEBOOM *et al* (pp 430-664) give an account of their discovery that *A. bellator* is a dangerous vector of malaria in Trinidad. This mosquito breeds exclusively in collections of water at the base of bromeliads which are extensively parasitic on the shade trees of cocoa plantations. It is anthropophilic and attacks chiefly in the late afternoon and evening. In the *Engineering News Record* (p 664) hints are given on methods of control of the breeding of *A. bellator*.

Pathology

VRYONIS (p 178) has studied the blood in subtertian malaria in four children. The peak of reticulocytosis was reached at the 11th day of treatment when the erythrocytes were at their lowest point. Thereafter reticulocytes decreased as erythrocytes increased. As the reticulocytes decreased leucocytes increased with marked eosinophilia but lymphocytes, basophiles and large mononuclears were unaffected.

PARISE and LUCREZI (p 516) have studied material obtained by spleen puncture in patients with chronic malaria who had been treated intensively with quinine. The principal finding was of hyperactivity of the reticulo-endothelial system. No definite evidence of non-pigmented free forms of the parasites could be found.

ORLINA (p 519) makes the point that in malaria the liver is as frequently enlarged as the spleen and gives the results of investigations of functional changes. Insufficiency is not uncommon in the acute stages and the author notes that malarial cirrhosis is common in the Kuibyshev district from which she writes.

Oedema is often seen in patients undergoing malaria therapy. HOPP and SOLOMOV (p 665) regard this as a result of the reduced osmotic pressure in patients free from renal damage or cardiac failure caused by the marked fall in plasma albumin which regularly occurs to a critical level at which oedema may be produced. Globulin tends to rise and the albumin globulin ratio therefore is very greatly reduced.

Clinical Findings

FIELD (pp 17-24) gives information on his method of rapid staining of thick blood films the whole process occupies less than 10 seconds

VAILLANT (p 200) draws attention to the importance of blood examination in all febrile conditions which are encountered in malarious areas. He quotes the experience at a hospital in the Sudan to which 50 men diagnosed as suffering from German measles were admitted. The condition did not clear up until a medical officer noticing enlargement of the spleen in several cases examined the blood of all the patients found *P. vivax* infection in each and gave quinine. The rash was apparently typical of German measles but it is thought probably to have been due to prickly heat brought on by the sweating induced by the malaria paroxysms.

SCHUFFNER (p 431) makes the point that in malaria a thorough search of a thick drop preparation by a competent person will always give positive results if the blood has been taken during a paroxysm but a negative finding in a fever-free interval does not exclude the disease. He considers that the frequent occurrence of a prolonged incubation period in *P. vivax* infections is probably related to a cycle of development in the reticulo-endothelial system. In his view the initial fever is due to a toxin different from that which causes the intermittent paroxysms which follow and against this toxin a firm and lasting immunity is developed.

SOUTHWELL SANDER and HAND (p 393) however report cases of malaria which illustrate the contentions that diagnosis may be justifiable even though at no time can parasites be found in the blood and that in pernicious attacks the paucity of parasites may give no indication of the severity of the condition.

DE NEGRI (p 520) has noted the frequency with which basophile granulation of parasite-free red cells is seen in the blood of malaria patients both in the presence and absence of parasites in the peripheral blood. He concludes that this granulation is of considerable diagnostic significance if parasites cannot be found and that it indicates a 70 per cent probability of a *P. falciparum* infection.

BELTRAN (p 812) has noted the frequency with which *P. vivax* is found in reticulocytes in therapeutic infections.

ALEXANDROV (p 200) notes that tertian malaria [presumably benign tertian] is often encountered in the Pamir mountains even in winter and that *Anopheles* are to be found at altitudes of 2 000 metres. He points out that malarial subjects with either active or latent infection often develop acute paroxysms on journeying from low levels to the mountains especially if the change to high altitude is made quickly. He discusses the various factors which may be responsible for these attacks and gives a list of diseases with which they may be confused emphasizing especially relapsing fever due to *Spirochaeta carle* which is endemic in this region.

COATNEY and YOUNG (p 600) have made detailed studies of the paroxysms due to induced *P. vivax* infections but these cannot further be summarized.

WILE and MUNDT (p 433) draw attention to the dangers of the therapeutic malaria showing that 29 patients in a series of 1 000 died as a result of the treatment. They give the immediate causes of death of which circulatory collapse was the most common and lay down the

rule that malaria therapy should only be given to patients whose hearts are well compensated. Other contraindications are mentioned and reference is made to symptoms which should be regarded as danger signals. CHOPRA *et al* (p 255) have used *P falciparum* for therapeutic malaria in India in a patient resistant to *P vivax* but they point out that this infection must be closely watched in view of possible rapid increase in the intensity of the infection. They note that *P falciparum* infection induced by blood injection is more easily controlled than that acquired naturally, but not so easily as *P vivax* infection.

In a discussion of cerebral malaria WRIGHT (p 432) states that malaria can be responsible for schizophrenic or confusional states though the pathology of these is not known. Cerebral malaria may simulate meningitis and be simulated by several infective diseases or by trauma or alcoholism. It may lead to permanent paralysis. The author quotes his experience of 16 cases. MENDEZ and HUMAN (p 432) describe symptoms of a cerebellar lesion arising probably from a *P vivax* infection.

MALLYAN (p 516) reports two cases of acute pulmonary oedema which occurred in young persons during their first attacks of malaria and which though severe cleared on treatment with quinine atebryn and plasmoquine. The evidence strongly suggests that malaria was the cause of the oedema and that the patients were in the non immune state.

SABLIN and EGOROVA (p 519) note that in malaria patients who are suffering from lobar pneumonia leucocytosis frequently does not occur and that there is a retardation of resolution. This failure to react as non malarial patients commonly do tends to lead to complications.

ZIKHEYEV (p 517) ascribes to malaria certain trophic skin lesions which cleared up under treatment with anti malaria drugs and quotes a case in which skin grafting in a patient subject to malaria was unsuccessful until the malaria was treated.

BYSTRITSKI (p 520) reports on disorders of the kidney observed in malaria in most of the cases the condition yielded to anti malaria treatment but in some persistent changes were produced with uraemic symptoms.

LOPATIN (p 518) discusses the subject of congenital malaria of which he records 35 cases. Most of the infants are underweight at birth and chronic disturbances of nutrition are common. These cases are often refractory to treatment and permanent effects such as infantilism or deficient resistance to infections may ensue. The author considers that congenital malaria may be the result of intra uterine infection due to malarial damage to the placenta or may be due to injury of the placenta at birth. SOEDARSONO (p 599) gives details of two cases of malaria from which he considers to have been contracted *in utero*.

From the experience of a case in a child in Florida in which he suspected that *P malariae* infection was transmitted by blood transfusion MARKS (p 252) suggests that it would be wise to exclude all donors who have had malaria or who come from malarial regions. [This point of view is obviously reasonable in malaria free countries but cannot of course be sustained in countries in which the disease is endemic.] Marks goes on to say that if it is impossible to exclude such donors the recipient should be given atebryn as a prophylactic. A further solution of the problem probably exists as the findings of GORDON (p 252) show. He records a case of quartan malaria due to the transfusion of stored blood from a donor in whom *P malariae* was

subsequently found. It was previously known that this could occur if the blood was stored for eight days or less and Gordon suggests that transfusion malaria may be avoided by using only blood which has been stored for longer than that period. In comment MOLLISON points out that blood taken from subjects who have lived in malarial districts may safely be used for obtaining serum or plasma. [It would perhaps be advisable to treat donors before taking blood with an anti-malarial drug though the effect of such treatment on the storage of blood would need to be watched.]

HOCH *et al* (p 20) have shown by injecting intravenously into non-malarious subjects the blood of persons infected with the McCoy strain of *P. vivax* in amounts calculated between the dose and the incubation period but that the character of the infection once established is independent of the infecting dose. Small standardized doses give more uniform results than the artificial methods generally employed, and doses of 100-250 trophozoites are sufficient to induce infection.

MOLLARET (p 21) notes that blood infected with *P. vivax* injected intramuscularly or intravenously into non-malarious subject without anticoagulant may but very rarely give rise to paroxysms of malaria in the recipient without any incubation period.

FRIEDEL (p 38) describes a case diagnosed as of meningococcal septicaemia in which the temperature showed a quartan periodicity. Parasites were not found and there was no response to quinine.

The complement fixation test in malaria has been examined by several workers whose results show considerable uniformity. COGGE (p 118) has investigated this reaction with an antigen prepared from *P. knowlesi* in the red cells of infected *Macacus rhesus*. This antigen reacts with sera from man infected with *P. vivax* or *P. falciparum* the complement fixation antibodies appear in the serum before the peak of *vivax* infection for about two weeks after the onset of symptoms and persist for five months after the disappearance of circulating parasites. Wassermann positive sera and sera from patients with other diseases give negative results in chronic infections of malaria. The test therefore appears to be useful in naturally acquired malaria. About 40 per cent of the tests were positive when parasites cannot be found with a *P. knowlesi* antigen in naturally acquired malaria. About 40 per cent of these positive results were found for two months or more after the parasites had disappeared.

parasites were present in the blood and these positive results were found for two months or more after the parasites had disappeared. A negative result however cannot be regarded as excluding malaria. KLIGLER and LOELI (p 250) have also used the complement fixation test in malaria with the *P. knowlesi* antigen prepared by Coggeshall. The test usually becomes positive during the third week after the onset provided that the patient has had two or more paroxysms. It tends to become negative during the fourth month after the last attack.

BLANEY *et al* (p 665) have also used the complement fixation test in malaria with the *P. knowlesi* antigen prepared by Coggeshall. They confirm the findings of KITCHEN *et al* that those tests are often given during or after the malarial febrile period but find that in general the tests become negative about one month after the termination of fever. In serological surveys to find the incidence of syphilis therefore regard must be paid to false positives due to malaria. As a result of a syphilis and malaria survey in

North Carolina FELLOWS and PERRY (p 387) are led to the opinion that natural malaria may give rise to false positive serum reactions of syphilis for a longer period than the 66 days for which they were shown to persist by KITCHEN *et al*

From these and other experiences it is known that serum from a patient with malaria may give a positive Wassermann reaction in the absence of syphilis. In an attempt to see if a complement fixation test in which cultured spirochaetes were used as antigen would remain specific for syphilis EAGLE *et al* (p 119) found that so far from this being so that test gave even more positive results than the Wassermann in non syphilitic malaria. The test therefore does not permit the serological differentiation of syphilis and malaria.

As a result of a study of the protein tyrosine reaction in malaria SWARTZWELDER and ADAMS (p 600) come to the conclusion that it has little more than a supplemental value.

D ALESSANDRO and SICARI (p 256) give reasons for their belief that the Henry reaction is more than a simple physico-chemical reaction claiming that the serum globulin of malarial subjects appears to have a particular affinity for melanin.

[To be continued]

Charles W. Sticks

RABIES

A REVIEW OF RECENT ARTICLES XXXVIII *

1. Virus

It has been customary to attribute the attenuation of rabies virus during the preparation of vaccine by the Pasteur method to desiccation. It has also been admitted that with the passing of the years and of the fixed virus (Paris) from rabbit to rabbit by intracerebral inoculation it has become more sensitive to desiccation (disappearance of virulence of the spinal cord after three to four days instead of the original six to seven days). It is true that the virus in the cord dried in air over caustic potash becomes attenuated but it is incorrect to state that it is desiccation which is the factor. It is probably the autolysis of the tissue whose action of the cellular proteolytic ferments whose action is favoured by the presence of the moisture and the conditions obtaining in the slow drying technique which accounts for the inactivation of the virus. VANSTEENBERGHE (1903) showed that if the virus of rabies is dried rapidly for example in a thin layer on a slide *in vacuo* over sulphuric acid it will retain its infectivity for several months. This has been amply confirmed by REMLINGER and BAILLY¹ in numerous experiments. Street and fixed virus behave similarly as regards resistance to desiccation. On the other

For the thirty seventh of this series see this *B H J* Vol 39 p 589

References marked with a † denote that the paper referred to was abstracted by Col A G McHENDRICK who was prevented by indisposition from completing the review. The remainder of the article is the work of Dr I A GALLOWAY

¹REMLINGER (P) & BAILLY (J) La dessiccation n'atténue pas le virus rabique elle le conserve (Premier mémoire)—*Ann Inst Pasteur* 1940 Sept Vol 65 No 3 pp 130-145

hand the virus of Aujeszky's disease is much more resistant to the slow process of desiccation over caustic potash than rabies virus. The present observations amplify those reported previously and bring them into line with what is known about the effect of desiccation on other viruses. No quantitative estimate of the degree of resistance of rabies virus to slow as opposed to rapid drying has been attempted. [The attenuation of the virus in the Pasteur method may lead to some denaturing of the virus protein. There are now known to be more perfect methods of drying virus than those previously employed. If Pasteur had employed these he would probably not have developed his method of vaccination against rabies.] As would be expected and has been proved also with other viruses rabies virus dried rapidly will subsequently resist higher temperatures (105°C and even 110°C for two to five minutes) than virus suspended in fluid.

As REMLINGER and BAILLY² point out reference has been made frequently in the literature to the existence of so called reinforced strains of rabies virus. There are few countries in which they have not been met. These strains have been described as reinforced or of exalted virulence chiefly because of their behaviour on intracerebral (i.c.) inoculation into rabbits in which unusually short incubation periods may occur. With most recently recovered street viruses the first symptoms after i.c. inoculation are observed on the 14th to 17th day. With reinforced strains incubation periods as short as two to three days may be observed. However in addition these strains are often associated with the absence of Negri bodies, greater resistance to diverse methods of attenuation and greater pathogenicity for usually relatively resistant species of animal. Much less is known or at least discussed about the viruses which are naturally attenuated. The incubation period in the inoculated rabbit may be 30, 40, 50, 120, 150 or even 200 days. The duration of the disease in the inoculated animal, rabbit or guinea-pig may be 8, 10, 13 or even 14 days instead of only two to three days. Then cachexia may be observed in inoculated small laboratory animals instead of the paralytic or less common furious type of disease. This cachectic form has been recorded previously in guinea-pigs. KRAUS observed it in rabbits inoculated with virus attenuated by passage in pigeons and LAMB and McFENDRICK in rabbits inoculated subcutaneously with fixed virus.

Passage of virus from the nervous tissues of cachectic animal will give rise to the paralytic type of disease. Viruses naturally attenuated may fail to infect less susceptible species such as bird. They may also fail more frequently to induce symptoms in susceptible animals when applied to the scarified skin, conjunctiva and when injected by the nasal route. The invasiveness is less and they exhibit greater sensitiveness to the action of physical and chemical agents. More curious however is their failure to take when inoculated into known susceptible species of animal. Thus to give an example a naturally attenuated strain of virus was inoculated into four rabbits, three guinea-pigs, a dog and a cat (intracerebrally). Only two guinea-pigs developed symptoms. Negri bodies may be regarded as cellular reactions. Their absence in the nervous system of rabbits inoculated with reinforced strains may be due to the fact that the cells have

not had sufficient time to react. In the case of small laboratory animals inoculated with naturally attenuated strains the Negri bodies are generally more widely distributed throughout the central nervous system although they may not be abnormal in size. It must be remembered that the behaviour of a strain of virus experimentally in small laboratory animals may bear no relationship to the aggressiveness of the strain in man. Moreover a naturally attenuated strain of rabies virus may assume normal virulence on passage.

The difficulty of determining with exactitude between a street virus and a fixed virus is not easy although as REMLINGER and BAILLY³ state it is sometimes desirable from either the scientific or the medico-legal aspect. A patient who is undergoing or who has undergone a course of injections with rabies vaccine may die following upon development of paralytic symptoms. Was death due to the effects of a street virus of exalted virulence or on the other hand was it a case of *rage de laboratoire* (rabies produced by inoculation with laboratory products)? Inoculation of rabbits and dogs may not be very helpful since periods of incubation, symptomatology, histological findings (presence or absence of Negri bodies, Babes nodules, neuronophagia and infiltrative lesions in nerve ganglia) may be identical whether the infective agent is fixed or street virus. The authors have attempted to confirm the affirmation of Stanislaw LEGEZINSKI [this *Bulletin* 1939 Vol 36 p 725] that fixed virus does not undergo any modification of virulence by passage in mice while on the contrary street viruses under the same conditions in the brain of white mice become avirulent after four to six passages and mice inoculated intracerebrally survive. The present authors employed street viruses of divers origin from Tangiers, Morocco and Gibraltar and from horse, dog and ass. They experienced no difficulty in making 10-12 passages in white mice by intracerebral inoculation. The grey mouse *Mus musculus* behaved likewise. Not attenuation but an exacerbation of virulence of the street viruses was observed on passage through mice.

MASON⁴ refers to the fact that it is known that the daughter strains of the original Pasteur (Paris) fixed strain of rabies virus differ from one another and from the parent strain in one or more attributes. In the same way street viruses may differ from one another in some respects. The author has estimated the virus potency (titre) of six strains of fixed virus for mice by intracerebral inoculation: the Pasteur (Paris) strain and its daughter strains Sassari and Tunis (36, 30 and 32 passages respectively in mice prior to present investigations); a dog strain L.T.W. fixed by mouse passage; S.K.L. a strain recovered from a skunk by mouse passage; and N.I.H. a strain maintained in guinea-pigs and rats (223, 6 and 6 passages respectively in mice before present experiments).

The m.c.l.d. (minimal cerebral lethal dose) of all six viruses lay between 10^{-4} and 10^{-5} . There appeared to be no difference between these fixed strains as regards antigenic potency in vaccination experiments. The author examined also 21 strains of street virus.

³REMLINGER (P) & BAILLY (J). Il n'est pas possible de tirer des passages par la souris un caractère différentiel entre le virus rabique fixe et le virus de rue — *Ann Inst Pasteur* 1941 Sept Vol 67 No 3 pp 186-188.

⁴MASON (H. C). A Comparative Study of the Behavior of Street and Fixed Viruses of Rabies in the Mouse — *Amer J Hyg* 1942 Sept Vol 36 No 2 pp 153-167 [17 refs].

by experiments in white mice. Some of the strains appeared to be more active than others. Titre and inactivity did not always run parallel. One strain with a m.c.i.d. of 10^{-4} killed mice more rapidly than did two strains with titres of 10^{-4} . Phenolized mouse brain vaccine given intraperitoneally protected mice against 10 to 100 m.c.i.d. inoculated intracerebrally. The same vaccine given subcutaneously protected mice against 1 to 10 m.c.i.d. He failed to demonstrate that hyperimmune rabbit serum could protect mice against intracerebral inoculation of either fixed or street virus.

GRY EZ⁵ in passaging the Lille dauter strain of Pasteur (Paris) inoculated rabbits the evolution of the disease was normal while in the remainder it was abnormal. Thus during the period March 1939 to September 1940 90 rabbits were inoculated. 68 showed a normal evolution of the disease (first signs 4th day, partially paralyzed 5th day, prostrate 6th day and 7th day, and dead 8th to 9th day) and in the other 22 the evolution was abnormal (deaths one on 4th day, 5 on 5th day, 15 on 6th day and 1 on 7th day). The 90 rabbits were inoculated in pairs, thus there were 45 pairs in 29 of which the course of the disease was the same in the two rabbits of each pair (6 times normal and three times abnormal). In the other 16 pairs one rabbit behaved typically and the other did not. This in spite of the fact that frequently rabbits of the same weight were used in each pair. It was thought possible that the method of storage of the virus might be affecting it. Such factors as temperature of storage, 23 C or 4 C medium (buffered or unbuffered glycerine) and weight of rabbits were investigated but no satisfactory explanation of the variations in incubation period in rabbits could be found. Biological variations unconnected with the weights of the rabbits might be responsible.

REMLINGER and BAILLY⁶ point out that Chamberland and others many years ago recorded the antiseptic action of certain vegetable essences. Recently LEGROS⁷ recorded that the essences of mustard, cinnamon and rosemary destroy certain bacteria in fluid suspension in 24 hours. In respecting the diastases contained in the same emulsion Baetjerophages behaved like diastase and not like bacteria. The present authors decided to test the effect of the vapour of eucalyptus in closed jars at 21 C on three viruses: those of rabies, equine encephalomyelitis (eastern strain) and Ajuszky's disease. Rabies virus was inactivated in 10 hours under these conditions that of equine encephalomyelitis in 21 days and that of Ajuszky's disease in 34 days. Control brain pulp smears were suspended in fluids at 21 C in the dark without eucalyptus. Rabies virus was inactivated in 4 days, equine encephalomyelitis in 11 days and Ajuszky's disease in 19 days. There appeared to be a definite antiseptic effect of the eucalyptus on the viruses. *Bact. typhosim*, *B. paratyphosim* A and B were killed in two hours under similar conditions whereas a spore forming microorganism like *B. subtilis* was not killed in less than three to four days. [Since the experiments were not done on a quantitative basis it may be that the apparent variable resistance of the three

GRISZ (Victor). Observations sur les causes modificatrices de l'évolution et l'efficacité des virus fixés.—4. *J. Pasteur* 1941
 rag ch les 1 pins inoculés rec 1 virus fixe —4. *J. Pasteur* 1941
 Mar 1 L 66 N 3 PP 185-190 With 1 fig
 REMLINGER (P) & BAILLY (J) A titre d'essence d'eucalyptus sur quelques
 ultravirus neurotropes.—4. *J. Pasteur* 1941 July Aug 1. 68
 N 7-8. PP 423-430

viruses could be explained by the different titres (virus potencies) of the test suspensions]

REMLINGER and BAILLY⁷ have previously recorded that neurones in the lung tissue may be infected with rabies virus. They considered that it would be interesting to determine whether mice could be infected with rabies by employing the common technique in virus work in mice of intranasal injection under anaesthesia. Nine of 27 mice contracted rabies when ether anaesthesia was employed and only one of 25 when the anaesthetic was not administered. In another experiment virus was recovered from the lungs of mice which were killed shortly after an intranasal injection. It is concluded by the authors that the virus gained access to the central nervous system from the lungs. [This may be so. However it must be remembered that the anaesthetic in preventing sneezing snorting and other expiratory movements also favours access of virus into the posterior nares and turbinates from which it may reach the olfactory lobes. Some of the injected virus may be swallowed.]

ii Diagnosis

SCHAEFFER and LEIDER⁸ record the recovery of rabies virus from a case of fatal nervous disease of unknown origin. A man walked into a hospital and asked to be admitted for observation. He complained of difficulty in swallowing and attributed this to poisoning by some person unknown. Later he became wildly delirious and he died two days later. Abrasions were found on the hand and a healing wound on the finger. At autopsy portions of nervous tissue were removed and placed in glycerine for subsequent examination for a possible virus infection. This material was stored frozen at -76°C later and a suspension prepared and inoculated intracerebrally into six mice, two rabbits and two guineapigs. Bacterial contamination led to the death of the rabbits and guineapigs. Rabies virus was recovered from the inoculated mice. Negri bodies were demonstrated in the brains of mice, guineapigs and rabbits of subsequent passages. Serum neutralization tests with a known antirabies serum confirmed the diagnosis. The titre of the virus increased from 10^2 to 10^5 (limiting infecting dilution) in the 11th passage and the incubation period diminished from nine days to six days. Subsequently information was obtained that the man had been bitten by his dog on the finger, the dog had had fits and then disappeared. Iodine was applied to the bite. The man's son was bitten on the leg on the same day and iodine was also applied to the bite. Apparently nothing further transpired in the case of the boy.

HERZOG⁹ reports on what he describes as a reliable and rapid method of diagnosis for rabies. The method is not a new one and consists of the examination of the *ganglion nodosum* (ganglion of the trunk inferior vagal ganglion or plexiform ganglion) of the vagus or pneumogastric

⁷REMLINGER (P) & BAILLY (J). Influence de l'anesthésie sur la transmission de la rage par voie pulmonaire—*Ann Inst Pasteur* 1941 Dec Vol 67 No 6 pp 465-466

⁸SCHAEFFER (M) & LEIDER (Ann G). Recovery of Rabies Virus from the Brain of an Undiagnosed Case—*Jl Lab & Clin Med* 1942 July Vol 27 No 10 pp 1263-1267 With 1 fig

⁹HERZOG (Ernst). Eine zuverlässige Methode zur schnellen Diagnose der Tollwut—*Klin Woch* 1942 Aug 22 Vol 21 No 34 pp 749-750 With 4 figs

nerve. The ganglion is more resistant to autolytic changes than the tissues of the central nervous system in which if only the bead is received for examination it may sometimes be difficult to demonstrate Negri bodies. After fixing in 10 per cent formalin frozen sections are made and stained with a 1 per cent watery solution of cresyl violet. After treatment with alcohol and xylol sections are mounted in Canada balsam and an observation can be recorded in about an hour. The tissue reactions consist of severe degenerative cell changes with tigrolysis and nuclear injury (cell shadows). There is also neuronophagia of the neurones and capsular cells and leucocytic infiltration with formation of the nodules of van Gehuchten and Nels. In silver preparations (e.g. Bielchowsky-Gros) there is intracellular neurofibrillar thickening (Cajal and Garcia) but this method of staining is not essential.

[These lesions of the nerve ganglion which have been described also in the spinal and sympathetic ganglia cannot be considered like Negri bodies as specific to rabies since they may be seen in any infection of the nervous system due to a virus. The author has referred to cases in man, dogs, horses, cattle, cats and swine in which it has not been possible to demonstrate Negri bodies. In such cases it is suggested that the examination of the ganglion nodosum could be diagnostic. No one has taken the horse as an example. Lesions in the spinal ganglia similar to those described in rabies have been observed in Born disease (Galloway). I.A. System of Bacteriology Medical Research Council 1930 Vol 7 p 347 H.M. Stationery Office London.] But as already well recognized their presence in an animal suspected to have been infected with rabies is of some aid to diagnosis since their presence indicates infection of the nervous system. This may help to confirm clinical observations especially if the CNS is not in a suitable state for examination. The presence of nerve ganglionic lesions may be said to provide strong presumptive evidence of rabies if the history suggests it. The examination of the plexiform ganglion of dogs suspected to have died of rabies is a routine procedure at the Pasteur Institute, Paris and it is a useful guide especially if the dog be young. Vallée showed that about a third of the old normal dogs which he examined had infiltrative lesions and neuronophagia in the nerve ganglia although to a less extent than in some dog infected with rabies.]

III Methods of Treatment and Statistics

It will be remembered that CUNNINGHAM, SHORTT and the workers found that the strain of fixed virus (ex Paris) in use in India was more antigenic than other strains of fixed virus of Indian origin [the Bulletin 1933 Vol 30 p 581 and 1934 Vol 31 p 64]. HAMPIL and ROBERTS have now compared the immunogenic properties of 17 strains of fixed virus using 21-day-old Swiss mice as the test animal. Immunity as tested by intracerebral injection of homologous virus. The results indicate that wide differences occur in the immunity response of the mice depending on the strain of virus employed. Certain strains protected only against 1 to 20 mld

H.M. (Bettylee) & ROBERTS
Properties of Fixed Rabies Virus
Vol 43 No 3 pp 397-407

(G.H.) Investigation of the Immunity of Mice to Rabies Virus Strains—J. Biol. Med. 1941 [10:1]

whilst others protected against as many as 100 to 1 000 m i d or even more of the homologous virus. The use of mice in the weeding out of non antigenic vaccines is now an established procedure. It seems not unreasonable to predict that killed vaccines prepared from a highly immunogenic strain will produce on repeated administration a greater degree of immunity to heterologous strains than those prepared from strains possessing low initial immunogenic properties. Studies along these lines are being continued.

A very remarkable non virulent vaccine has been developed by WEBSTER and CASALS^{11†}

Two months old beagle dogs are injected intracerebrally with mouse brain rabies virus Pasteur strain. When the animals are prostrate their brains are removed weighed triturated and diluted with buffered distilled water to make a 5 per cent emulsion. This emulsion is then centrifugalized at 500 r p m for 5 minutes and the supernatant removed. This supernatant to immunize must titer at least 330 000 mouse doses per ml and be relatively free of large particles. It is then rendered non virulent by exposure to ultraviolet light for 35 minutes. Tests for sterility are made and the vaccine is then ready for use. The vaccine can be prepared within 7 days released within another 7 days is relatively free from brain tissue and appears quite harmless.

With regard to its properties the authors cite experiments showing that the irradiated vaccine protects mice against 10 000 lethal doses whereas a chloroform vaccine protected against 1 000 and a widely advertised phenolized vaccine gave no protection at all. It was found that a single dose of 0.1 ml of irradiated vaccine is ample to immunize mice consistently against street virus injected intramuscularly. Post infectional tests were carried out on groups of mice infected with 0.01 ml of street virus into the gastrocnemius muscle and given vaccine treatment commencing three hours later. No phenolized vaccine has given a clear cut protective effect. chloroformized vaccines occasionally show some. The irradiated vaccine however in five doses totalling 0.5 ml prevents rabies in most instances.

The final tests on dogs gave the following results —

Of 162 unvaccinated dogs injected with virus about 84 per cent died. Of 62 dogs given commercial phenolized vaccine 3 weeks prior to the test injection of virus 72 per cent died. Of 52 given chloroformized vaccine 50 per cent died. Of 35 given 30 to 40 ml of irradiated vaccine in a single dose all were protected save one. of 24 given 5 to 10 ml of the vaccine concentrated 6 times all were protected.

WEBSTER and CASALS¹ have previously described experiments the results of which showed that a vaccine containing at least 50 000 mouse intracerebral lethal doses (m i d) of rabies virus rendered non virulent by suitable irradiation with ultraviolet light will immunize mice and that a vaccine containing 25 000 000 m i d will immunize dogs against a subsequent test inoculation of rabies virus. In the present experiments the authors proposed to determine whether it was possible to immunize dogs with the required number of mouse doses of vaccine concentrated into a small volume and whether a single injection was adequate. The technique of the preparation of the

^{11†} WEBSTER (L. T.) & CASALS (J.) An Improved Non Virulent Rabies Vaccine. *Amer Jl Public Health* 1942 Mar Vol 32 No 3 pp 768-770

¹² WEBSTER (L. T.) & CASALS (J.) A Non Virulent Single Dose Rabies Vaccine for Prophylactic Immunization of Dogs — *Jl Experim Med* 1942 Aug 1 Vol 76 No 2 pp 185-194

vaccination method by a modification of the Semple method a 4 per cent suspension of rabbit cord in 0.5 per cent phenol incubated at 37 C for 48 hours. The dose was 4 cc instead of the original 2 cc. Three formulae are given for its application presumably according to the severity of the case to be treated. (1) 14 doses of one per day (2) 21 doses of two per day for five days then one per day (3) 31 doses three per day for five days then one per day. Since the introduction of the Semple method the mortality diminished from three per 1000 to 0 for 35000 cases treated. Vaccination of dogs is also carried out with the following vaccine: 50 cc physiological saline 50 cc glycerine 125 cgm phenol 25 gm brain and cord of rabbits inoculated with fixed virus incubation at 37 C for 72 hours. Dose 4 cc per kilo inoculated subcutaneously into the flank. Up to 1935 300000 dogs were vaccinated with a mortality rate of 14 per 100000 as against the previous record of 7800 cases of rabies in 10 years. The capture of stray dogs is also carried out. From 1939 to 1941 4575 dogs were captured. Control of rats is advocated also. During the same three years in 364 cases bites were due to rats. It is interesting to note also that in 1932 of 18 rats caught in the garden of Cartagena Tacubaya six were proved to be infected with rabies by inoculation of rabbits. Stress is placed also on the necessity for the routine inspection of dogs in premises. It is not always realized that dumb or paralytic rabies is often overlooked. Owners frequently attempt to handle and treat cases with dysphagia believing the symptoms to be due to a bone stuck in the throat. If they have injuries or scratches on the hand or these are produced during the examination the risks are obvious. The rest of the paper deals with statistics etc.

CRUVEILHIER and VIALA¹⁴ report on the antirabies vaccinations carried out by the Pasteur Institute Paris during the year 1940 according to the plan established at the International Rabies Congress. 1196 persons presented themselves for treatment and it was considered that 449 of these should receive vaccine. The method of treatment which is already well known is given in detail. The method is that of Pasteur. The cords are dried in flasks in a dark room at 22 C over caustic potash. After 2-3 or 4 days of desiccation the cords are placed in small bottles containing sterilized neutral glycerine. The vaccines thus prepared are kept at 3 C in the ice chest. The cords are no longer used for vaccination if they have been in glycerine more than 10 days. Each day the patients receive 4 to 5 mm of cord in 3 cc of physiological saline. Treatment lasts 15-18-21 or 25 days according to the severity of the bites. On December 31st 1940 the fixed virus employed had been passed 1670 times since it was first employed in the antirabies service in rue Ulm. The cords are removed from the rabies infected rabbits by Oshuda's method. The rabbits are killed and bled as soon as paralysis is complete so as to avoid possible secondary bacterial contamination. 254 of the treated patients were bitten by stray dogs 43 by stray cats 106 by dogs and 35 by cats with known owners 10 by rats and one by another animal. Four hundred and forty one of the patients belonged to Category C i.e. the animal responsible for biting was suspected of rabies the

¹⁴CRUVEILHIER (L.) & VIALA (Ch) Les vaccinations antirabiques à l'Institut Pasteur en 1940—Ann Inst Past 1941 June Vol 66 No 6 pp 483-488

20 years in practice. He states that there was an acute transverso lesion of the cord and no lesions elsewhere in the nervous system. There was abdominal pain vomiting and general discomfort including a burning sensation all over the body pain in the back over the dorsal spines of the sixth and seventh vertebrae and constipation. These symptoms were observed on July 27th 1941 *ie* after six daily injections had been given. Later July 29th 1941 there was retention of urine a slight temperature rise and symptoms of paralysis of the lower extremities. These persisted till August 20th 1941 when the paralysis completely disappeared. There was no further record of any disturbance except that the bladder condition took a long time to clear up.

The first case of postvaccinal paralysis since the introduction of a carbolized rabies vaccine (Semple) in May 1938 is reported from Vienna by PIRINGER¹⁷

Vaccination Method	No of cases treated	Fatal cases of rabies	Cases of Myelitis	
			No	Per cent
Pasteur & Alivisatos 1919-Sept 1923	2 488	17	30	1.2
Hogyes & Alivisatos I Oct 1923-1926	1 934	3	4	0.21
Hogyes & Alivisatos II 1934-1937	1 750	3	3	0.22
Semple May 1938-Aug 1941	1 249	0	1	0.07

As seen from the above table (which omits records for the period 1926-1934) before this date a combination of other methods of vaccination had been employed. The Semple vaccine has given good results the fatal cases of rabies have diminished and also the number of cases of postvaccinal paralysis.

v Rabies in Animals

FRANKLIN¹⁸ stresses the undesirability of animals susceptible to rabies being kept as pets by military personnel in countries where the disease is prevalent. He gives the history of an outbreak involving two dogs and a cat kept as pets. Soldiers had to be treated with vaccine after being bitten by one of the dogs. The cat also attacked a human being before it was destroyed. The diagnosis of rabies was confirmed by biological tests.

¹⁷PIRINGER (Walter) Myelitis post vaccinationem contra lyssam nach der Methode von Semple—*Z nt f Bakt I* Abt Orig 1942 Mar 26 Vol 148 No 7/8 pp 321-331 [8 refs]

¹⁸FRANKLIN (A. V.) An Outbreak of Rabies—*Jl Roy Army Vet Corps* 1942 Aug 18 Vol 13 No 4 pp 121-122

remaining eight belonged to Category B as rabies had been diagnosed by the clinical picture in the dog or cat. In 17 of the cases of category C a histological examination of the plexiform ganglions (*ganglion nodosum*) revealed infiltrative lesions as seen in the early stages of infection of the nervous system by a virus such as rabies. In 396 cases the bites inflicted were deep and in 289 cases no clothing protected the bitten person. In 316 cases the bites were about the head or upper limbs.

255 cases were treated within 4 days after the bite

95 cases were treated within 5 to 7 days after the bite

63 cases were treated within 8 to 14 days after the bite

18 cases were treated within 15 to 21 days after the bite

18 cases were treated more than 21 days after the bite

In none of the 449 cases treated were any untoward effects recorded i.e. no cases of post-vaccinal paralysis and no deaths. A table is given as usual showing the results of vaccination since the procedure was first instituted in 1886. Since 1925 no fatal cases following vaccination have been recorded.

YEN¹⁵ has re-examined the possibility of experimental sero-prophylaxis in mice. Contradictory results have previously been reported. Certain workers have reported the prolongation of the percentage survival over untreated controls. The control of the weight and age of the test animals is important in such experiments as also are the dosage of virus, the route of infection, the quantity of serum in antiviral units, and the interval between virus infection and anti-serum administration. The observations reported indicate the beneficial effects of a single dose of antiviral serum against many fatal doses of rabies virus. Fixed rabies strain (Habel) was employed and maintained by frequent intracerebral passage in mice. Sera were prepared from rabbits by intra-abdominal inoculation of 5 cc doses of a phenol-treated vaccine given twice weekly for the first four weeks followed by similar injections with a live vaccine for four to six weeks. The live vaccine was a 10 per cent suspension of brain from rabbits dying on the 8th to 10th day after rabies infection. The phenol-treated vaccine consisted of a similar suspension containing 0.5 per cent phenol and incubated at 37°C for 48 hours. All vaccines were employed within two weeks after preparation. The antisera employed contained 3.3×10^4 antiviral units and these were kept in the frozen state without antiseptic in a refrigerator. The author concludes that the administration of a single dose of potent antirabies serum given intraperitoneally 10 to 15 minutes after infection with virus is capable of prolonging the life span of intracerebrally infected mice and saving the lives of some intramuscularly inoculated mice depending on dosage of serum and amount of virus given. The combined use of vaccine and antiserum afforded full protection to the mice tested with 100,000 minimal cerebral lethal doses of virus.

1. Paralytic Incidents

A case described as acute myelitis following antirabies vaccination is recorded by DANG¹⁶. He had seen only this case during a period of

YEN (C. H.) Protects Val. of Antiviral Serum in Experimental Rabies
Infection—Proc. S. E. Asian B. I. & M. 194. Apr. Vol. 49. No. 4
pp. 533-537

DANG (M. L.) Acute Myelitis (Post Anti-Rabies Inoculation)—Indo-
Malaya. 194. Mar. Vol. 11. No. 6. pp. 173-174

20 years in practice. He states that there was an acute transverse lesion of the cord and no lesions elsewhere in the nervous system. There was abdominal pain vomiting and general discomfort including a burning sensation all over the body pain in the back over the dorsal spines of the sixth and seventh vertebrae and constipation. These symptoms were observed on July 27th 1941 i.e. after six daily injections had been given. Later July 29th 1941 there was retention of urine a slight temperature rise and symptoms of paralysis of the lower extremities. These persisted till August 20th 1941 when the paralysis completely disappeared. There was no further record of any disturbance except that the bladder condition took a long time to clear up.

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¹⁷PIRINGER (Walter) Myelitis post vaccinationem contra lyssam nach der Methode von Semple — *Zent f Bakt I* Abt Orig 1942 Mar 26 Vol 148 No 7/8 pp 321-331 [28 refs]

¹⁸FRANKLIN (A. V.) An Outbreak of Rabies — *Jl Roy Army Vet Corps* 1942 Aug 18 Vol 13 No 4 pp 121-122

vi Miscellaneous

LEVADITI¹⁹¹ reports experiments upon the association of herpes and the street virus of rabies. When a mixture of the two viruses is inoculated intracerebrally into mice the two viruses persist through one or two passages. Then the rabies virus becomes less apparent and finally disappears. The reason of this according to the author is that the virus of herpes destroys the neurones and so prevents the formation of Negri bodies.

LEVADITI¹⁹² and his collaborators have reported previously on the results of inoculating mixtures of two different viruses intracerebrally into mice. Thus they found that if a mixture of herpes and rabies virus was inoculated into mice the virus of herpes upplanted that of rabies on further passage. On the other side by side if a mixture of rabies and lymphogranuloma inguinale can exist because the two viruses inoculated intracerebrally into mice perhaps because the virus of rabies have somewhat different tissue-cell affinities. In the present limited experiments a mixture of the virus of louping ill and rabies street virus was inoculated intracerebrally into mice. The strain of street virus employed was Bucareti II and it was stated to be a strain associated with the formation of Negri bodies in the CNS of inoculated mice (somewhat loosely described as 'virulent'). The virus of louping ill produces an intense encephalitis and attacks nerve cells in the *Cornu Ammonis*. On the basis of histological examination alone the author concluded that louping ill virus supplanted that of rabies when further passages were made. No Negri bodies were seen [It is surely rather hazardous to draw conclusions from histological evidence only. It is known for example that the attribute of a strain of rabies virus to produce Negri bodies can be lost under certain circumstances. Furthermore this result may have been obtained because of a disproportion in the relative amounts of each virus in the mixture.]

AJESZKY'S DISEASE

The virus of Ajeszky's disease readily infects the chorion allantoic membrane of the developing chick embryo and produces pocks which may coalesce to form ulcerative encephalitis in a wide variety of animals. BANC¹⁹³ considered that a selective effect of the central nervous system of the chick on the virus was to be expected. He found that all four strains of virus of Ajeszky's disease studied had a marked neurotropism in the chick embryo. The four strains employed were (1) a Hungarian strain sent to Shope in 1931 (?) (2) a strain 1930—recovered by Shope from cattle. Both 1 and 2 were fixed or old established strains in that they had been passed in rabbits more than 50 times. Strain (3) Iowa B—Shope and (4) a strain—recovered by Ray from swine in Nebraska had been passaged in rabbits only 15 and 5 times respectively and are referred to as field

† LEVADITI (C.) Association of ultravirus Herpes trig. d. ru. C. R. Soc. Biol. 194. Ap. V. L. 136 N. 7-8. pp. 331-33.
* LEVADITI (C.) Association of ultravirus Herpes trig. d. ru. C. R. Soc. Biol. 194. July. V. L. 136 N. 13-14. pp. 474-475.
† BANC (F. d. r. k. B.) Experiment. Infect. n. f. th. Ch. k. Embry. with th. Virus. f. Pseud. rabies. — J. E. per. m. M. d. 194. 5 pt. 1. V. L. 76 N. 3. pp. 263-270. With 7 figs. n. pl. tes. [76 refs.]

strains All four strains after being cultivated in eggs produced one or more of the following conditions (1) Fatal encephalitis when inoculated intracerebrally into rabbits (2) Pruritus when inoculated subcutaneously into guinea-pigs and rabbits (3) Pock lesions on chorio allantoic membranes were neutralized by hyperimmune swine serum (4) Intracellular inclusions in chick embryos When 12 day embryos were used there were scattered pocks on the chorio allantoic membrane and with greater concentrations of virus large ulcers were seen Lesions on the membrane were followed by infection of all tissues of the central nervous system of the embryo The fixed or old established strains produced a hemorrhagic destruction of the embryo brain referable to the action of the virus on the endothelium of the blood vessels No neuronophagia was observed in the c.n.s. Intracellular inclusions indistinguishable from those of herpes were found in all nerve cells not only the neurones but in cells of the meninges choroid plexus and of the retina in some cases There was also some infiltrative neuritis with polymorphonuclears This widespread destruction of the c.n.s. of chick embryos has not been reported previously Field strains lacked the tendency to produce haemorrhagic reactions in the embryo brains but when seeded on to the chorio allantoic membranes they infected the nervous tissue The reaction of the chick embryos to the virus varied with the age of the embryo as regards the development of encephalitis following upon the membrane lesions Thirteen 15 and 18 day embryos were inoculated and also two-day old chicks *Thirteen day embryos* (16 day when fixed) showed large ulcers and confluent pocks with low dilutions of virus nerve tissues extensively involved and haemorrhagic lesions prominent *15-day embryos* (20 day when fixed) 5 to 10 scattered pocks on membranes Many nerve cells were destroyed but there was no haemorrhagic reaction a few leucocytes penetrated the brain tissue *18 day embryos* no visible lesions on the chorio allantoic membrane—encephalitis of non haemorrhagic type *two day old chicks* some developed encephalitis in six days no haemorrhagic reaction only slight nerve cell destruction perivascular polymorphonuclear infiltration and neuronophagia with mononuclear infiltration Gial nodules were seen also *I A Galloway*

JOHNSON (H N) Significance of the Negri Body in Diagnosis and Epidemiology of Rabies—*Illinois Med J* 1942 May Vol 81 p 382 [Summary taken from *Jl Amer Med Assoc* 1942 Aug 1 Vol 119 No 14 p 1138]

According to Johnson Negri bodies cannot always be found in man and animals dying of rabies It is necessary to resort to animal inoculation when the microscopic examination of a brain specimen is negative All brain specimens received at the Georgia State Health Department in 1937 for the diagnosis of rabies were examined microscopically and those found negative were studied by mouse inoculation Of the 771 specimens found positive for rabies 10.5 per cent were Negri negative In an epizootic of fox rabies 137 brain specimens were positive for rabies by mouse inoculation and 9.4 per cent of these were microscopically negative An analysis of 92 mouse positive brain specimens obtained in Alabama from dogs that had been vaccinated one month to one year before the onset of rabies demonstrated that 14 per cent were Negri negative When dogs were experimentally infected with rabies by intramuscular inoculation

39.7 per cent of the animals were negative by microscopic examination. Forty-six per cent of the dogs developing rabies were vicious at some time during the course of the disease. Only 21.4 per cent of these were Negri negative as compared with 59 per cent for the dog with paralytic rabies. This partially explains the discrepancy between the Negri findings in natural and experimental rabies as the majority of routine specimens are from vicious and biting dogs. The duration of symptoms before death is correlated to the absence or abundance of Negri bodies. Vaccinated dogs dying of rabies exhibited the same clinical course as unvaccinated controls and the error in microscopic diagnosis was approximately the same in the two groups. The studies suggest that rabies street virus is altered in either virulence or manner and site of multiplication during epizootics of the disease and at this time a higher proportion of the infected animals will be Negri negative. The rapid microscopic diagnostic method of Sellers is recommended. The indications for animal inoculation of brain specimens are enumerated and the white mouse is recommended for the purpose.

ALBES (Vladimir) & GALLIA (Francisco) Estudios inmunológicos sobre la pluralidad de los virus rabícos en Venezuela [Immunological Studies on the Plurality of Rabies Viruses in Venezuela].—*Bol. Int. Investigaciones del Caracas* 1942 Jan Vol. 1 No. 1 pp. 1-45. (11 refs.) English summary.

From an epizootological standpoint there are in Venezuela two kinds of rabies: one of a sporadic character occurring chiefly among carnivores (dogs and foxes) and occasionally among other animals (cattle); another of a distinctly enzootic character peculiar to cattle and called *paralytic rabies*. While the former seems to have a genuinely canine origin, in the spread of the latter the vampire bat (*Desmodontidae*) plays a part.

In view of the etiologic-epizootological difference the writers undertook studies of an immunological character availing themselves to this effect of the Habel test (slightly modified) for the titration of anti-rabies vaccines.

According to his method mice immunized with 6 intraperitoneal injections of the anti-rabies vaccine on test receive then by the intracerebral route the rabies virus in serial tenfold dilutions (1:10, 1:100, 1:1,000 etc.). By injecting simultaneously and with higher dilutions non-immunized control mice one is able to determine to a fair degree of accuracy how many lethal doses of the virus the vaccinated animals have withstood.

Now using this method in cross-immunity tests of several vaccines or rabies viruses as the writers did it is relatively easy to find out whether there are any immunological differences.

In addition to the cross-immunity tests the writer also carried out neutralization tests *in vitro* with antisera obtained from mice discarded from the Habel tests (mice which following immunization withstood the intracerebral inoculation of the homologous virus). In order to assure a greater accuracy in this test it is necessary to determine simultaneously besides the minimum neutralizing dilution of the antiserum on test (using it in several serial dilutions but mixed always with an equal amount of virus of the same concentration) the minimum lethal dilution of the examined virus.

In all 6 rabies viruses were investigated 5 native ones and the sixth a *Pasteur* fixed virus strain from the Rockefeller Institute. Of the 5 native viruses 3 were isolated from cattle affected with paralytic rabies (States of Bolivar and Miranda) and the 2 remaining ones from sporadic cases in a canine and a bovine in the State of Tachira. The bovine is supposed to have been bitten by a rabid dog.

Two of the Venezuelan viruses (both from paralytic rabies cases) already had when investigated fixed virus characteristics due to their having undergone numerous passages through bovines (fixed *Bolivar* virus with 95 passages and fixed *Miranda* virus with 76 passages) whereas the three remaining ones were street viruses.

The anti rabies vaccines used for this purpose have been two (1) a *Pasteur* vaccine made from the above mentioned *Pasteur* virus and (2) a *Bolivar* vaccine prepared from the *Bolivar* virus referred to. In both of them were used brains and cords from bovines killed at the climax of the disease the final product being a 15% suspension of brain and cord in 1% phenolized saline solution. After remaining 3 weeks in the cold room the vaccines were ready for use.

The results obtained in this research may be summed up as follows

- 1 By means of the Habel test originally intended to determine the protective power of anti rabies vaccines the plurality of rabies viruses in Venezuela has been established
- 2 The Habel test by virtue of its high sensitivity has proved to be most suited for carrying out immunological studies of this nature
- 3 Five native viruses immunologically compared with a *Pasteur* virus strain split into two biologically different groups one consisting of viruses with antigenic properties resembling those of the *Pasteur* virus and another composed of viruses resembling each other but differing from the former group
- 4 The writers assume that this biological difference or plurality of the Venezuelan rabies viruses is due to their different source. In effect while the *Pasteur* group was made up of genuinely canine viruses in the other group appeared only viruses proceeding from paralytic rabies cases supposed to be spread by bats
- 5 The chief immunological difference between the two groups rests on the fact that while the *Pasteur* vaccine has conferred a most satisfactory protection against the *Pasteur* group viruses (canine) it has almost completely failed with regard to paralytic rabies viruses (supposed to come from a bat source). On the contrary the vaccine prepared from fixed native virus of paralytic rabies (*Bolivar* virus) has shown a polyvalent antigenic action on all the six viruses investigated whether fixed street canine or of paralytic rabies
- 6 The one sided action of the *Pasteur* vaccine might be explained in the writers opinion by the modification which the *Pasteur* virus may have undergone after so many rabbit passages to the extent of acquiring really specific characteristics. Hence the vaccine made from it acts first of all on the homologous virus and also naturally on kindred viruses such as the canine while it does not protect against the paralytic rabies virus (bat source) which is biologically more distant. On the contrary the *Bolivar* virus either by its special antigenic

properties or by its relatively few passages and, consequently lesser differentiation developed under action of a polyvalent character.

- 7 The serum neutralization tests *in vitro* gave results much resembling those of the cross-immunity tests.
- 8 It has been established that sera of mice newly-discarded from the Habel tests for the titration of anti rabies vaccines are most suited for serum neutralization tests *in vivo*.
- 9 The discrepancies between the present findings and those of preceding workers which did not disclose any biological difference between the canine rabies virus and the paralytic rabies virus are explained in the writers opinion by the dissimilarity of the methods made use of.
- 10 Finally there arises the need of fighting paralytic rabies in tropical countries by means of vaccines prepared from fixed paralytic rabies virus or even better fixed native virus.

MALARIA

DUREN (4) Contribution à l'étude du paludisme endémique au Congo Belge district du Kwango Contribution to the Study of Endemic Malaria in the Kwango District of the Belgian Congo.—*Ann. Soc. Bel. de Méd. Trop.* 1940 Sept. 30 Vol. 20 No. 3 pp. 260-271

This paper records the results of the blood examination of 772 inhabitants of four villages on a plateau 900 to 1000 metres high between the rivers Wamba and Inza and between latitudes 6° and 7° S. Thick drop preparations were alone examined. Very few of the native children of this region present obvious signs of chronic malaria. Malaria parasites were found in 33.6 per cent of the bloods. In the first year of life only 6.25 per cent of infants harboured parasites. Thereafter the parasite index increased, attaining its maximum 45 per cent in the age group 11 to 20 years. No parasite was found in the eight persons over 30 who were examined. These figures indicate that there is but little local infection in the villages. Nearly all the *Anopheles* caught in the huts were *A. durseni* Edwards. Many infections may have been contracted in the Inza Valley which lies below the altitude of 600 metres.

P. falciparum is by far the most prevalent species. It was found alone in 202 of the 257 positive preparations and in combination with *P. malariae* or *P. vivax* or both, in 16 others. *P. vivax* was found alone only twice in combination with other species nine times. *P. malariae* was the only species seen in 12 thick smears. In combination with other species it was seen nine times. There were two triple infections. Gametocyte carriers numbered 72.

No trypanosomes or spirochaetes were seen in any of the bloods examined. Microfilariae were frequently seen probably *Aca. thockleyi-nema persians*.

Norman White

SCHWETZ (J) & BAUMANN (H) Contribution à l'étude du paludisme endémique dans le district du Kwango (Congo Belge) [Contribution to the Study of Endemic Malaria in the Kwango District of the Belgian Congo]—*Ann Soc Belg de Méd Trop* 1940 Sept 30 Vol 20 No 3 pp 345-353

Two previous papers dealing with malaria in the Kwango District have been published. SCHWETZ & GERONDEZ found that *P. falciparum* and *P. malariae* were almost equally prevalent. LAMOTE found only *P. falciparum* infections [this *Bulletin* 1939 Vol 36 p 778 1940 Vol 37 p 126]. In the present paper the authors record in very great detail the results of their examination of thick drop blood preparations obtained from 353 natives of four villages between the Lukula and Luie Rivers from which neighbourhood Lamote obtained his material. As elsewhere in the Lower Congo the proportion of infants and young children harbouring malaria parasites is very high the parasite rate then decreases with increasing age. The gametocyte indices were very low. Parasites were scanty in nearly all smears except in those from young children. *P. malariae* was found but not frequently. In one village in which the infection rates were lowest *P. malariae* was not found at all. The authors cite this as a warning against attaching too great importance to results obtained by random sampling.

Norman White

SCHWETZ (J) & BAUMANN (H) Quelques données sur le paludisme endémique dans l'agglomération de Stanleyville en 1939 [Certain Facts regarding Endemic Malaria in Stanleyville in 1939]—*Ann Soc Belg de Méd Trop* 1940 Sept 30 Vol 20 No 3 pp 355-370

Between 1928 and 1932 the authors carried out several inquiries into malaria prevalence in Stanleyville the results of which were duly published [this *Bulletin* 1930 Vol 27 p 644 1934 Vol 31 pp 418 474]. Since then until the appearance of this paper nothing further has been published on the subject. A Health Service was established in Stanleyville in 1932 since when it has devoted much attention to the mechanical prophylaxis of malaria.

In 1939 examination was made of the blood of 109 infants up to 2 years of age at the Infant Welfare Centre of Stanleyville and of 348 scholars aged 6 to 15 years at the School des Freres Maristes. The results of these examinations are compared with those obtained in the same institutions 7 to 11 years earlier.

The parasite index of the infants 51.3 per cent was appreciably lower than in 1931 and 1932 when it was 83 and 87 per cent but the proportion of children harbouring gametocytes was almost the same 40 and 48 per cent. In a third of the positive films *P. malariae* was found in association with *P. falciparum* the predominant parasite. *P. vivax* was not found at all in 1939 though in 1931 and 1932 it was found in 3 and 4 per cent of positive bloods.

The parasite index of the scholars was 94.2 as compared with 87.8 in 1928. That parasites were very few is shown by the fact that had thin smears alone been examined the parasite rate would have been but 25.5. *P. malariae* was found in 9 per cent of the positive bloods. A few *P. vivax* were found five times none was seen in 1928. The scholars had an appreciably lower gametocyte rate than 11 years previously.

On the whole there has been little change in the malaria endemicity of Stanleyville

SCHWETZ (J) Sur une épidémie mystérieuse suspecte et soupçonnée de paludisme constatée dans une agglomération indigène d'un très haut plateau du Ruanda [Mysterious Epidemic Suspected Malaria among the Native Population of a very High Plateau of Ruanda]—*Ann Soc Bel e de Méd Trop* 1941 Mar 31 Vol 21 No 1 pp 36-61 With 2 maps

A plateau some 1900 metres above sea level rising above the southern shore of the small Lake Luhondo in the northern part of Ruanda very near the Uganda frontier and described in this paper and Lake Kivu is the scene of the incident reported among In 1938 and 1939 a notably increased mortality was reported among the native inhabitants on this plateau. A medical officer carried out investigations on three occasions and came to the conclusion that malaria was responsible for the increased morbidity and mortality. He found malaria parasites in the blood of a high proportion of the sick. In September 1939 the author of this paper carried out an inquiry. He was very sceptical as to the possibility of malaria being responsible for an epidemic at such a high altitude. No vector species of *Anopheles* have ever yet been found on these high plateaux. His findings are fully reported. The only *Anopheles* found breeding were *A. mauritanicus* as a serious vector of malaria. Of 106 children under 15 years of age examined only seven had any splenic enlargement and in these cases the enlargement was but slight. The blood of 275 individuals was examined. Malaria parasite were found in 25 of whom 15 were children under 10 years of age. Seven of the positive findings were among 32 individuals who had reported sick. *P. malariae* was responsible for just over half the infections. *P. falciparum* for the remainder. *P. vivax* was not seen. Quartan gametocytes predominated. There was not a single heavy infection and no microscopic evidence of acute malaria. But there was a feeble proportion of infection among all age groups examined. It would seem that malaria was not responsible for the epidemic but no explanation is forthcoming as to how the women and children on this high plateau who are not known to have visited endemic areas acquired their infections. It is hard to understand how they could have acquired an immunity or tolerance to malaria.

Norman White

SCHWETZ (J) With the collaboration of H. BAUMANN Recherches sur le paludisme dans les camps miniers de la division de Kadubu Musva de la Miniere des Grand Lacs (M.G.L.) et dans les camps miniers du secteur de la Lubumbe du Comité National du Kivu (C.N.K.) (District du Kivu) [Researches on Malaria in the Mining Camps of the Kadubu Muswa Division of the Surface-Mine of the Great Lakes (M.G.L.) and in the Mining Camps of the Lubumbe Sector of the National Committee of Kivu (C.N.K.) in the Kivu District]—*Ann Soc Belge de Méd Trop* 1941 June 30 Vol 21 No 2 pp 87-129 With 1 map

These two collections of mining camps some 30 kilometres apart lie 90 to 100 kilometres south-east of Costermansville on the southern

shore of Lake Kivu In the Kadubu group (M G L) both *A. gambiae* and *A. funestus* occur and there is severe endemic malaria Blood examinations were indicative of this Many of the labourers come from the Ngweshe region which is free from malaria It might be expected that these would suffer from acute even epidemic malaria Such outbreaks had indeed been reported but when the inquiry was undertaken most of the miners had been present two or three years and had apparently attained a state of premunition The mining camps of the Lubumbe sector of the C N K are at a higher altitude anophelines are rare and malaria endemicity is but feeble The findings are set out in very great detail

Norman White

- 1 VAN WYMEERSCH (H) Contribution à l'étude du paludisme dans un groupe de collectivités indigènes du Congo Belge (Villages de la rive gauche du fleuve Congo en amont de Léopoldville) [Malaria in Native Villages on the River Congo above Leopoldville] —*Rec Traux Sci Méd Congo Belge* Léopoldville 1942 Jan No 1 pp 81-85 With 1 map
- 11 TROLLI (G) Endémie malarienne au Chenal d'après les examens microscopiques et les tableaux statistiques du Dr van Wymeersch [Endemic Malaria in Chenal according to the Microscope Examinations and Statistical Data of Dr van Wymeersch] —*Ann Soc Belge de Méd Trop* 1941 June 30 Vol 21 No 2 pp 131-166 With 1 map

These two papers contain accounts of the same work Dr van Wymeersch of the Foréamu (*Fonds Reine Elisabeth pour l'Assistance Médicale aux Indigènes du Congo Belge*) examined the blood of all the inhabitants of the villages on the left bank of the Congo from Kwamouth where the Kasai joins the Congo to Stanley Pool making 3 178 examinations The author of this paper rearranges and comments on the findings The population is mobile and floating Cutting firewood for river steamers and fishing provide occupation for the men the cultivation of manioc for the women There is no scarcity of food but sleeping sickness is rife (27 per cent infected) The population is declining This would appear to be the case from the constitution of the population (3 178) examined adult males 34.7 per cent adult females 33.4 children aged 0 to 3 7.2 children aged 3 to 15 24.6 per cent The thick drop method of blood examination was used throughout Of the 3 178 examined 45.56 per cent were infected with malaria The parasite indices were children 0 to 3 90.4 children 3-15 64.5 and adults 33.9 per cent In 747 of the 1 448 positive cases schizonts were rare *P. falciparum* gametocyte carriers represented 15.5 per cent of the population Quartan parasites were found in 99 persons 72 of whom had mixed infections No *P. vivax* was identified

Norman White

- SCHWETZ (J) with the collaboration of H BAUMANN Mme BEUMER & M FORT Sur le paludisme endémique constaté dans six agglomérations indigènes du Bas Lomami (Congo Belge) [Endemic Malaria found in Native Villages on the Lower Reaches of the Lomami River (Belgian Congo)] —*Ann Soc Belge de Méd Trop* 1942 Mar 31 Vol 22 No 1 pp 45-71 With 1 map

The villages concerned in this report are situated on either side of the last 250 km of the Lomami River before it joins the Congo at Isangi

[March 1943]

west of Stanleyville. This area lies between 1° S and 1° N of the Equator. The medical service of this part of the Belgian Congo was entrusted in 1937 to Cerrubac (Medical Centre of the Brussels University). The anopheline fauna is almost restricted to the ubiquitous *A. gambiae*. A very few *A. funestus* were captured and in one place specimen of *A. marshalli* and *A.oucheti* were found. Thick drool preparations and blood smears were made from 812 native inhabitants of various age groups living in six widely separated centres of population. The results of these blood examinations are set out in minute detail. The parasite rate of children varied from 83 to 94 per cent of adults from 30 to 46 except for one inhabited locality where it was as low as 20. The gametocyte index was 32 per cent for children and 13 for adults. These figures are fairly representative of hyperendemic malaria conditions as they are found in Central Africa. *P. vivax* is very rare, one solitary adult malarial infection was noted in association with *P. falciparum* and is nearly always found in association with *P. falciparum* it was very rarely found in adult. The proportion of person infected with microfilariæ is extremely high. *W. persians* is much more common than *L. loa*. *Orchocerca volvulus* was largely confined to the members of a tribe the Mukuma in an area some 200 kilometres from the Congo. *S. nidiolum damnosum* is common. *S. nidiolum edusaeforme* was also found. *Culicoides* *grammii* is a very troublesome pest in some localities.

ESMEL (L.) JAKOB (A.) & GÖLZ (H.) Elektronenoptische Untersuchungen an Malaria Sporozysten und Beobachtungen an Kulturformen von *Leishmania donovani*. [Electronoptical Observations of Sporozoites of Malarial Parasites and of Culture Forms of *L. donovani*. — *Deutscher Tropen Zeitschrift* 1942 July 1 Vol 46 No 13 pp 234-238 With 9 figs.]

The authors have made observations on the sporozoites of malarial parasites and the culture forms of *Leishmania* by means of the electron microscope. They find that the sporozoites have one end more pointed than the other and that those of *P. falciparum* are less uniform in size than those of *P. vivax*. Evidence as obtained of the existence of a definite periplast. Certain other appearances were difficult to interpret. As regards the flagellate forms of *L. donovani* it was noted that the flagellum was extraordinarily thick and that it ended abruptly. The cytoplasm showed clear and dense areas indicative of a varuolated structure. Microphotographs illustrate the various findings.

RODHAN (J.) & VAN HOOFF (W. Th.) Recherches sur l'anophéline en Belgique. [Researches on Belgian Anophelines.] — *Annales Soc. Bel. Entom.* 1942 Mar 31 Vol 22 No 1 pp 19-43 With 1 map 23 refs.]

The authors present a careful account of what is known of the former prevalence of malaria in Belgium. They are doubtless correct in thinking that it was transmitted by *Anopheles maculipennis atroparvus* and not by *mesasiaticus* the only other variety which occurs. *A. atroparvus* is found in Belgium not only in slightly brackish waters in the coastal region of Western Flanders and in polders (reclaimed land from the sea) in the province of Antwerp but also in certain inland localities in which the water is quite fresh.

P. A. Burton

- GASPERINI (G C) La fauna anofelica della Piana di Selacià (Tigrai Orientale) [The Anopheles of the Plains of Tigre]—*Boll d Soc Italiana di Med e Igiene Trop* (Sez Eritrea) Asmara 1942 Vol 1 No 2 pp 105-106 English summary (2 lines)

- BELLAMY (R Edward) Observations on the Macroscopical Species-Identification of Larval *Anopheles* in Georgia—*Jl Parasitology* 1942 Aug Vol 28 No 4 pp 299-310

When making surveys of breeding places of *Anopheles* it is useful to be able to recognize the various species in the field with the naked eye even if such preliminary identifications are not entirely reliable. The author has found that in Georgia the fourth instar larvae of *Anopheles quadrimaculatus A crucians* and to a lesser extent *A punctipennis* can be distinguished with fair accuracy without magnification. In a test on over one thousand larvae there was an error of less than 4 per cent. The characters used for this purpose are set out fully in tables. The characters however are not mutually exclusive they are merely relative. The author therefore concludes that they cannot be regarded as a reliable substitute for the usual microscopic identifications based on larval chaetotaxy. Their chief value lies in the help they give in recognizing the microhabitats of particular species within a given breeding place.

- ROHNE (W C) Reconnaissance of Anopheline Larval Habitats and Characteristic Desmids of the Okefenokee Swamp Georgia—*Public Health Rep* 1942 Aug 14 Vol 57 No 33 pp 1209-1217 [15 refs]

The Okefenokee Swamp occupies an area of some 700 square miles. The inhabitants are free of malaria though the disease is common in surrounding regions.

Very careful collecting of adult and larval *Anopheles* has shown that *A crucians* is common and that it enters houses. Other species seem to be absent including *A quadrimaculatus* which is very widely distributed and is the main vector of malaria in south eastern United States.

The water of the swamp is very acid (pH 3.7 to 3.9 in general) and sphagnum moss is abundant. The author's personal interest appears to be in desmids (a group of microscopic Algae) he shows that they are particularly abundant in this type of water and gives a list of species characteristic of this swamp.

[The absence of most species of *Anopheles* from water containing sphagnum is evidently a widespread phenomenon familiar in many parts of northern and central Europe. See also this *Bulletin* 1940 Vol 37 p 181.]

- SMITH (J Vincent) Outbreak of Malaria in a Cruiser at War—*Jl Roy Nav Med Serv* 1942 July Vol 28 No 3 pp 234-244

During late April and early May 1941 the personnel of a cruiser some 620 officers and men were nightly subjected to the attacks of anopheline mosquitoes at the height of a malaria season. This paper describes the results of that nightly ordeal—159 cases of malaria two of them fatal. [For obvious reasons the locality of this sad experience is not disclosed but references to climatic conditions then prevailing

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afford some clue. From the symptoms described and other considerations one would have expected *P. falciparum* infections to have been predominant but we are told that benign tertian quartan and subtertian infections were encountered and the first attacks were probably mixtures of at least two out of the three. The account gives a very graphic picture of the extreme difficulties of handling such an epidemic on board a cruiser on active service in war conditions. Experience taught the author that it is dangerous to withhold specific treatment until the diagnosis has been confirmed microscopically. The staining of films in ships in tropical climes is said to be more difficult than ashore. The author considers that the modern idea of discarding quinine as a prophylactic is correct. Most medical men with experience of malaria would certainly recommend the prophylactic use of atabrin or quinine by men for whom it was impossible to provide protection from mosquitoes at the height of a malaria season unless the stock of these remedies were only sufficient for treatment of clinical attack. Certain other views expressed by the author are unusual the presence of crescent in the blood is not common regarded as an indication for giving quinine intra venously. On the other hand, had circumstances permitted the use of intravenous injections of quinine the present cases described some of the anxieties might have been avoided. Very many difficulties are unmounted in coping with this outbreak and in the circumstances it is gratifying that there were not many more cases and more deaths.

Norman White

JAVETT (S. V.) & SACKS (S). Chronic Meningococcal Septicaemia Simulating Malaria—*South African Med J* 1942. Aug. 22 Vol. 16 pp. 307-308 With 1 chart

This is a report of an unusual and interesting case. An askari aged 23 fell ill in Tananika. He had high fever, generalized body pains, headache, chills, sweat and increase in weakness. The temperature rose every second or third day, sometimes two days in succession in the late afternoon to 102° or 103°. The paroxysms were always accompanied by sweating. The blood was not examined. A clinical diagnosis of malaria was made and the patient received 30 grains of quinine a day for 10 days. The symptoms continued. He was transferred to Kenya and four weeks later was admitted to a general hospital there. The temperature had assumed a definite tertian periodicity. Neither spleen nor liver was palpable. There was no rash. No parasites of any kind could be found in the blood. There was a polymorphonuclear leucocytosis. Arthralgia and myalgia persisted between the attacks. Quinine treatment was continued.

On the eighth day in hospital after 35 days of intermittent fever the temperature fell to normal. A five-day course of atabrin was given. The patient's general condition improved but he complained increasingly of headache. On the 42nd day of illness the patient had a rigour. Signs and symptoms of meningitis developed. Cloudy fluid withdrawn by lumbar puncture contained numerous pus cells and meningococci. Treatment with alphanitrophenol effected a cure. There seems to be little doubt that this is a case of chronic meningococcal septicaemia. [See also the *Bulletin* 1942 Vol. 39 p. 738.]

Norman White

KILHAM (Lawrence) Meningococcal Septicaemia with a Malarial Type of Fever—*Brit Med J* 1942 Dec 12 p 696 With 1 chart

This case closely resembles that described by PRIEST [this *Bulletin* 1942 Vol 39 p 738] There was a similar tertian or quartan periodicity of fever the temperature falling to normal between paroxysms and erythema nodosum leucocytosis ranged from 12 000 to 17 000 during febrile periods falling to 10 000 or less in the intervals In the present case *N meningitidis* Group 2 was isolated twice from the blood of the patient (which was negative for malarial parasites) taken just before peaks of temperature Rigidity of the neck and splenomegaly were absent throughout

Before the diagnosis was established the patient was given sodium salicylate and after that no further rise of temperature occurred but a course of sulphadiazine was administered later to lessen any chance of relapse This case illustrates the bizarre picture which may be presented in meningococcal septicaemia C 11

PERENCZI (Alexander) Klinische Beobachtungen ueber Malaria [Clinical Observations on Malaria]—*Deut Med Woch* 1942 June 12 Vol 68 No 24 pp 614-615

Malaria is rare in Komárom and out of about 6 500 hospital patients only one case of the disease in 1939 and three in 1940 were reported whereas in 1941 up to the end of October 27 cases were seen Twenty of these men whose illness started between the end of April and the middle of July when mosquitoes were absent had served during the previous autumn in endemic areas of malaria in the Siebenburgen district on the border of Hungary and Rumania [The author finds what he calls an incubation period of more than half a year strange but makes no mention whether the men were receiving suppressive treatment during their period of exposure to infection nor does he state the species of parasite found Seven of the patients showed atypical clinical symptoms and the only lesson to be learnt from the paper is the necessity for thinking of malaria when fever arises in patients who have previously been in malarious areas] F Murgatroyd

PICCINELLI (Amedeo) I gruppi sanguigni nella malaria [Blood Groups in Malaria]—*Riv di Malariaologia* Sez I 1941 Nov-Dec Vol 20 No 6 pp 353-365 [42 refs] French summary (6 lines)

This paper starts with a discussion of the views of many authors regarding immunity to malaria without reference however to a great deal of the most important work that has been done on the subject This is followed by a discussion of work that has been published on blood grouping with special reference to the susceptibility of individuals of different groups to infections of varying kinds The author's own observations relate to 100 cases of malaria Of 73 persons infected with *P falciparum* 32 were Group A 128 Group B 7 Group AB and 6 Group O Of 26 *P vivax* infections 15 concerned Group A 3 Group B 3 Group AB and 5 Group O The only *P malariae* infection was of a Group B patient It is acknowledged that these observations as they stand have but little significance

Norman H Hute

GUARDASCIONE (Vincenzo) Un raro caso di rottura spontanea della milza in soggetto malarico [Rare Case of Spontaneous Rupture of the Spleen in a Malarial Subject]—*Riv di Malarologia* Sez I 1941 Nov-Dec Vol 20 No 6 pp 378-387 German summary (5 lines) [56 refs]

A man aged 30 was treated for an acute attack of malaria with large doses of quinine. The spleen was palpable two finger breadths below the costal margin. Three days after the return of the temperature to normal when the patient appeared to be making satisfactory progress the spleen ruptured and death quickly ensued. The post mortem findings are described. The case serves as the text for a long interesting discussion on spontaneous rupture of the spleen with very numerous references to the literature. Norman White

FAIN (A) & BENTZ Observations sur des accès d'hémoglobinurie survenus dans deux consultations de nourrissons chez des jeunes enfants après administration de quinine prophylactique [Haemoglobinuria in Young Children attending Two Infant Welfare Clinics after Administration of Prophylactic Quinine]—*Ann Soc Bel de Méd Trop* 1940 Sept 30 Vol 20 No 3 pp 273-276

The prophylactic distribution of quinine to native infants and young children has been practised for several years in the Lufimi Lower Sele region of the Belgian Congo. Quinine dihydrochloride in solution 0.015 gm per kgm body weight is given once a week. No harmful effects were ever noted till the occurrences reported in this paper. A child of three years received 0.2 gm of quinine some hours later it had a violent febrile attack and passed brownish red urine. It was brought back to the Dumi Dispensary in the evening in a state of coma and died half an hour later. Six months later a child aged four years from the same house as the previous case but of a different mother was brought to the dispensary the day following the administration of quinine with a temperature of 39 C prostration vomiting jaundice and reddish brown urine. It recovered. Four other cases of children all aged about four years are reported from three other dispensaries in the district in which the administration of prophylactic quinine was followed by the passing of red urine. Malaria is hyperendemic in the neighbourhood from 80 to 90 per cent of young children are infected mostly with *P. falciparum*. Norman White

RAFFAELE (G) & SANDICCHI (G) Alcuni esperimenti con il prodotto sintetico Gamafar [Experiments with the Synthetic Preparation Gamafar]—*Riv di Malarologia* Sez I 1941 Nov-Dec Vol 20 No 6 pp 366-377 German summary

Gamafar appears to be almost if not quite identical with plasmoquine. It is an Italian synthetic product manufactured by the S A Farmaaceutica Italiana which also produces Italchina the Italian atabrine substitute. Experiments are described which are exactly comparable with many that have been published with regard to plasmoquine. Nine *P. falciparum* gametocyte carriers of whom two were patients undergoing malaria therapy and the remainder suffering from naturally acquired infection each received 0.03 gm of Gamafar daily for five successive days. The gametocytes were not very numerous in any of these cases. Their number increased in a few cases in the early days of

treatment but at the end of 10 days or less no gametocytes were to be found. From four of the patients *Anopheles* were infected before treatment was begun attempts to infect *Anopheles* on the second day of treatment and later all failed. A supplementary experiment on three patients all harbouring large numbers of crescents showed that a single dose of 0.02 gm of Gamexar was sufficient to destroy the infectivity of the blood for *Anopheles*.

Norman White

AHMED (N) Five Years of Anti Malaria Work at Lillooah Railway Settlement—*Jl Indian Med Assoc* 1942 Aug Vol 11 No 11 pp 348-351 With 5 graphs

Lillooah about five miles to the north west of Calcutta is in the water logged plain on the west bank of the Hoogly. It contains an important railway settlement. In 1933 *A. ludlowi* was found breeding in a tank. Malaria was very prevalent. There were about 600 tanks within a half mile radius of the settlement all of them prolific breeding places for mosquitoes. An energetic malaria campaign was started in which filling draining oiling and Paris green were all utilized. The results have been gratifying. Days lost by a staff of 900 on account of malaria and fevers numbered 904 in 1938-39 as compared with 3 979 in 1934-35. Twelve species of *Anopheles* have been found in Lillooah. Vector species were *A. philippinensis*, *A. culici facies*, *A. varuna* and *A. ludlowi*.

Norman White

D AMATO (Hugo J) Profilaxia del paludismo en la República Argentina [Control of Malaria in Argentina]—*Bol Oficina Sanitaria Panamericana* 1942 Mar Vol 21 No 3 pp 233-235 English summary

During 1940 and especially from January to April a decided increase in the number of cases of malaria was observed in the North Argentine region where the disease is endemic with the exception of those areas protected by public health services thus proving the efficiency of the methods applied. More than 170 000 patients were examined by the services of the National Department of Health and more than 20 000 in the provincial and municipal institutions (5% more than last year).

P. falciparum accounted for 33% of the infections as compared to 12% for the year before. Control work is on the dual basis of treatment and prevention. In 1940 11 200 more patients were treated than in 1939 and more dispensaries were opened. Around 1 600 kg of quinine are distributed every year. Health education is carried out intensively. Around 350 000 pesos are appropriated every year for preventive work and private donations add about 50 000 pesos. In 1940 30 250 houses were visited in 8 210 of which mosquitoes were found chiefly *Anopheles pseudopunctipennis* and also a few *A. tarsus maculatus*, *A. argyritarsis*, *A. perizi* and *A. albitarsis*. Drainage filling in and other sanitary procedures were carried out on a large scale. More than 200 000 liters of petroleum and 70 000 kilos of Paris green were used. Studies are being made on improving malaria control methods and the bio chemical factors of larva breeding (in Salta the influence of water and soil phosphorus).

GUINDY REPORT OF THE KING INSTITUTE FOR THE PERIOD FROM
1ST OCTOBER 1940 TO 30TH SEPTEMBER 1941 pp 29-34—
Studies on *Plasmodium gallinaceum* [MENON (K. P.) AYYAR (P. V.
Sitarama) & SHORTT (H. E.)]

In this report are given the results of various experiments with *Plasmodium gallinaceum*

1 It is shown that the naturally occurring malarial parasite of the jungle fowl (*Callus sonnerati*) is inoculable to chickens and is indistinguishable from *P. gallinaceum*. It is concluded that the jungle fowl is the natural host of this parasite.

2 It has previously been reported that exoerythrocytic schizonts could be demonstrated in chicks on the sixth day of the incubation period after inoculation of sporozoites. It is now stated that such forms have been found on the fifth day.

3 It is shown that the brain of a chick removed on the fourth day of the incubation period after sporozoite inoculation is infective to other chicks and that the brains of such brain inoculated chicks are also infective on the fourth day. It is thus possible to make serial passages of the incubation period stages in the brains of chicks on the fourth day of incubation and similar results were obtained on the fifth and sixth days of incubation. The earliest day on which erythrocytic stages can be seen in the blood is the seventh day but the blood is infective on the sixth day. [See also ADLER and TCHERNOMORETZ this Bulletin 1942 Vol 39 p 524]

4 The effect of deep and superficial X rays on sporozoites was studied as follows—

(a) Sporozoites in *Aedes aegypti* were unaffected by one hour's exposure. The mosquitoes still transmitted the infection.

(b) The exposure for an hour of the site of the injection of sporozoites in the chick did not prevent infection.

(c) Exposure for 7½ to 12½ minutes of citrated infected blood did not reduce its infectivity.

(d) The exposure of the site of inoculated blood did not prevent infection.

(e) Exposure of *A. aegypti* before feeding them on infected chicks did not prevent their infection.

[For the effect of ultra violet radiation on sporozoites of *P. gallinaceum* see this Bulletin 1942 Vol 39 p 300]

5 A volume of infected blood mixed with an equal volume of 1 in 50 000 solution of methylene blue lost its infectivity when exposed to bright sunlight for five minutes. There was no loss of infectivity without exposure to sunlight nor did blood lose its infectivity when exposed to sunlight in the absence of methylene blue. Gentian violet in the same dilutions showed no such photodynamic action.

6 (a) The blood of sporozoite-infected chicks is infective from the sixth day while parasites are first seen in the blood on the seventh day.

(b) Sporozoites were still infective after 1½ hours in 0.95 per cent normal saline or 2 per cent citrated saline. After two hours they ceased to be infective.

(c) Sporozoites were injected into the pectoral muscle of chicks. The inoculated area was excised in one case after 18 hours and in another after 24 hours. An emulsion of the excised tissue was not infective suggesting the early removal of sporozoites from the site inoculated as the excision did not prevent infection of the original chicks.

- (d) Massive doses of sporozoites dropped on to the scarified skin of two chicks failed to cause infection
 (e) Single infected red blood corpuscles injected into chicks failed to produce infection
 (f) It was not possible to infect geckos and toads by the injection of infected chick blood
 C M Wenyon

MISSIROLI (A) Ueber die Entwicklung der Sporozoiten der Malaria parasiten [Development of Sporozoites of the Malaria Parasites]
 —*Zent f Bakt I Abt Orig* 1942 Mar 26 Vol 148 No 7/8
 pp 359-363 With 1 fig

This is a controversial paper in which the author argues against the findings of KRAUTH and MUDROW maintaining that these investigators have mistaken ordinary developmental forms of the bird malarial parasite which may undergo schizogony in cells other than red blood corpuscles for the immediate developmental forms derived from sporozoites. He again states that the early development of sporozoites takes place extracellularly in the lymph spaces of the tissues and not within histiocytes [See also this *Bulletin* 1940 Vol 37 p 671 and 1942 Vol 39 p 123]
 C M Wenyon

PORTER (Richard J) The Tissue Distribution of Exoerythrocytic Schizonts in Sporozoite Induced Infections with *Plasmodium cathemerium* —*Jl Infect Dis* 1942 July-Aug Vol 71 No 1 pp 1-17 With 2 text figs & 8 coloured figs on 1 plate [31 refs]

The authors have made a careful examination of the blood and organs of canaries infected with various strains of *Plasmodium cathemerium* and *P. relictum* with the object of determining the distribution in the body of exoerythrocytic schizonts. In a number of the strains it was not possible to discover any such forms but in two of them they appeared when infection was produced by sporozoite instead of blood inoculation. In the case of birds inoculated with sporozoites it was found that in the early stages of the infection exoerythrocytic schizonts occurred only in the liver spleen and bone marrow. At later stages of infection they were abundant throughout the body in endothelium and capillaries and locally in large numbers in intravascular accumulations of macrophages which occurred in all the organs. It is suggested that two processes may be involved. In the one the exoerythrocytic schizonts are developed directly from sporozoites and occur in the liver spleen and bone marrow in the other they are the result of the developmental merozoites produced by erythrocytic schizonts finding their way into endothelial cells of all tissues and organs
 C M Wenyon

BOYD (Geo H) & GILKERSON (Seth W) Influence of Conditions of Latency upon Merozoite Production and Gametocyte Survival in *Plasmodium cathemerium* Infections of Canaries —*Amer Jl Hyg* 1942 July Vol 36 No 1 pp 1-5

The authors have studied the reproducing form of *Plasmodium cathemerium* after inoculation of large numbers of parasites taken from canaries at the height of an infection into canaries which have had no

previous infection and into canaries which have passed into the latent phase of infection. They have found that the schizonts appearing in the previously uninfected birds produce on an average 14 merozoites while those in the previously infected birds give rise on an average to only 10.8 merozoites. It thus appears that there is some condition existing in the bird with latent infection which hinders multiplication in that the schizonts produce a reduced number of merozoites. It has already been shown by BOYD that in any individual infection the schizonts are largest at the commencement of the infection and that they decrease in size and produce few merozoites as the crisis is approached. An increase in size occurs when the parasites are reduced in number at the crisis but the size of the initial schizonts is never reached. In the case of gametocytes inoculated into previously uninfected birds and into birds with latent infection it was proved that they disappeared more rapidly from the blood of the former.

C. M. Wenyon

HEWITT (Redginal) Studies on the Host Parasite Relationships of Untreated Infections with *Plasmodium lophurae* in Ducks—*Amer Jl Hy* 1942 July Vol 36 No 1 pp 6-42 With 10 figs & 2 coloured plates [26 ref.]

In 1938 COGGESHALL discovered a malarial parasite *Plasmodium lophurae* in a Borneo pheasant and successfully inoculated it to domestic fowls. It was maintained by inoculation of fowls or pheasants till WOLFSON in 1940 demonstrated its infectivity to ducks in which after intravenous inoculation of infected blood the intensity of the infection far exceeds that produced by any other bird malarial parasite with the exception of *P. gallinaceum* in chickens. Interest in this parasite has increased owing to its suitability from the point of view of the size and convenience of the duck for experimental studies on malarial parasites. It was evident that if the duck was to be employed for such observations as complete a study as possible of the natural course of *P. lophurae* infection in these birds of various ages should be made. Thus the author of the paper under review has very largely accomplished and he gives a very full account of the results he has obtained. Special attention is paid to the influence of dose of parasites and the age and weight of the birds on the resulting infections and the mortality rate. In order to observe the effect of infection on the blood it became necessary to study the normal blood picture of the duck and the results of this study are fully described with the aid of a coloured plate illustrating the various blood cells encountered. Periodicity studies have been carried out and it has been shown that the degree of synchronicity is low though it was possible to demonstrate that the asexual cycle occupied 36 hours. A coloured plate depicts *P. lophurae* at various stages of development in the duck. It is noted that so far it has not been possible to demonstrate for this parasite the exoerythrocytic forms which are such a prominent feature of *P. gallinaceum* infections in fowls. This for certain chemotherapeutic experiments is a distinct advantage.

The whole paper which includes numerous tables and charts is evidently the result of very careful study and observation. It will prove invaluable to all those who contemplate using ducks infected with *P. lophurae* for the study of malaria problems.

C. M. Wenyon

MARSHALL (C K) Jr LITCHFIELD (J T) Jr & WHITE (H J) Sulphonamide Therapy of Malaria in Ducks—*Jl Pharm & Experim Therap* 1942 May Vol 75 No 1 pp 89-104 With 7 figs [30 refs]

In this paper the authors describe methods for testing possible anti-malarial drugs on ducks infected with *Plasmodium lophurae*. In the first place the course of infection in ducks of a certain age and size was studied with a view to obtaining criteria for judging therapeutic activity. It was found that the highest percentage (about 85 per cent) of red blood corpuscles was infected on the sixth day after intravenous inoculation of a standard dose of infected red blood corpuscles. By obtaining the percentage of infected red blood corpuscles in the blood on the sixth day it was possible to obtain a figure indicating the activity of a drug administered before this. This figure could be correlated with the survival time and the percentage survival. It was already found that for a satisfactory test it was necessary to keep the concentration of any drug in the blood as constant as possible. This could only be done by repeated daily doses. The procedure was finally adopted of incorporating the drug in any required concentration in the food and keeping the birds in alternating dark and light surroundings of three hours duration. This procedure ensured that the drug was voluntarily ingested by the birds every three hours. By this method a large number of sulphonamide derivatives were tested and compared with quinine which in the concentrations employed reduced the percentage of red blood corpuscles infected on the sixth day from 85 to less than one. Of the sulphonamides tested sulphapyrazine gave a figure of 2. *N*-methylsulphanilamide, sulphanilylguanidine, sulphathiazole and sulphadiazine a figure of five. Others gave higher figures and were thus less active as anti-malarials. It was of interest to note that *p*-aminobenzoic acid itself having some anti-malarial activity when administered alone nevertheless had an antagonistic action on sulphonamides when given together with them.

This paper which describes in detail the technique employed and the method of handling and feeding the ducks and discusses the observations which led to the adoption of the standard method of testing drugs is a most important one which should be carefully studied by all those working on the chemotherapy of malaria. C M Wenyon

MARSHALL (E K) Jr Chemotherapy of Avian Malaria—*Physiol Rev* 1942 Apr Vol 22 No 2 pp 190-204 [108 refs]

This paper is a review of literature—over 100 references are given—dealing with all aspects of the chemotherapy of avian malaria. It mentions the various species of bird malarial parasites which have been used for chemotherapeutic studies and the many drugs which have been investigated including quinine and other cinchona alkaloids, atabrin, plasmoquine and the sulphonamides. Various special aspects of the subject are discussed. These include the action of drugs on different stages of the parasite, species and strain variation in susceptibility to drugs, the possibility of complete cure, drug fastness, *in vitro* studies and the mechanism of action of drugs. A vast amount of information is contained in the 10 pages of the review which should be read by all those who contemplate embarking on the chemotherapeutic investigation of bird malaria. C M Wenyon

TRYPANOSOMIASIS

DUREN (A) & LEJEUNE (E) Incidence de la trypanosomiase chez les Européens fonctionnaires et agents du Congo Belge de 1908 à 1939 Sa gravité et ses séquelles La trypanosomiase maladie professionnelle [Trypanosomiasis in Government Officials in the Belgian Congo]—*Ann Soc Bel e de Méd Trop* 1942 Mar 31 Vol 2^o No 1 pp 1-9

This review concerns 45 cases detailed in three tables. The general incidence among Government agents is approximately 0.75 per 1,000 but is 6-7 times higher among the medical personnel and those engaged in itinerant service are twice as liable.

None of these patients is known definitely to have died of the disease but enquiry was not complete at the date of publication.

C. C. Chesterman

LAWSON (T. L.) Trypanosomiasis treated with Pentamidine — *Lancet* 1942 Oct 24 pp 480-483

This paper deals with the results of treating 53 cases of Gambian trypanosomiasis with diamidino diphenoxy pentane (pentamidine). The cases were not selected but were the first 53 diagnosed in the West Nile district of Uganda in 1941. The work was carried out under primitive conditions but probably most of the cases had not been infected for longer than three or four months since the entire population is examined for sleeping sickness once every three months. The chief clinical findings are recorded. After the clinical examination enlarged cervical glands were punctured and the following blood examinations were performed: cell counts, estimation of haemoglobin and colour index, differential white-cell count and separation of the blood test. For this test 8 c.c. of blood is taken and diluted with 2 c.c. of 3.8 per cent sodium citrate (these proportions were chosen because a portion of the same blood serves for the sedimentation rate). The mixture is left standing for 2 hours in a narrow test tube. The plasma just above the level of the top of the sedimented cells is taken off, a film of the plasma made and stained with Leishman stain. Lumbar puncture was carried out, a cell count was done on the cerebrospinal fluid which was also tested for excess of globulin by the Nonne-Apert reaction with saturated ammonium sulphate and finally the cerebrospinal fluid was centrifuged and the deposit examined for trypanosomes. A thin blood film was also examined for parasites. It is interesting to note that in the 49 cases with positive gland puncture trypanosomes were found on only two occasions in thin blood films. In the first 20 cases the blood was also examined by the triple centrifuge method but although parasites had been found in the glands of all the cases in only two were they found by this method.

Treatment with pentamidine was started after all these tests were completed, the drug being given daily by the intravenous route. Every day gland puncture was performed until the juice was negative for at least two consecutive days. After the third injection all the investigations mentioned above were repeated. After the tenth injection which completed the course for most of the patients the investigations were again repeated. If a patient had a second course the tests were done once more at the conclusion. Finally all the cases were re-examined two to three months after the end of treatment.

As it was impossible to weigh the patients dosage was regulated according to age. Patients between 6 and 10 were given 0.05 gm at each injection. Patients of 11 and over were given 0.1 gm at each. Of the 53 patients 43 had 10 injections 6 had 20 injections one (a large man) had 10 injections of 0.1 gm followed by 10 injections of 0.2 gm. One woman with a heavy infection had 3 injections of 0.1 gm followed by 5 of 0.2 gm but she was so weak after this that she was unable to get out of bed. 2 patients had 6 injections one receiving a total of 0.3 gm and the other a total of 0.6 gm. All the injections were given daily by the intravenous route.

On examination two or three months after the end of treatment 41 patients were clinically cured three much improved four improved and four unaltered or worse one had died. The results of examination of gland juice are as follows. Four cases were negative before during and after treatment. Of the remaining 49 cases which were positive before treatment 31 had a negative gland juice after the first injection 12 after the second injection five after the third injection and one after the fourth injection. All these cases remained negative throughout the observation period. The state of the cerebrospinal fluid in the 53 cases before treatment is shown in the following table —

Group	Cells per c mm CSF	Cases in group	Cases with excess glob	Cases with trypanosomes +
1	Under 10	8	0	0
2	10-80	22	3	0
3	80-200	7	3	2
4	Over 200	16	16	5

As might be expected the treatment had no significant effect on the cell count in cases of group 1 but 19 of the 22 cases in group 2 showed a reduction in cell count whilst under treatment. One patient refused further lumbar puncture in one case lumbar puncture was not repeated owing to advanced pregnancy and in one there was no alteration during treatment. Five of the seven cases in group 3 also showed a reduction in the cerebrospinal fluid cells during treatment. When they were re-examined two or three months after treatment four of the seven cases showed an increase in cells above the original amount. In group 4 14 of the 16 cases showed a reduced cell count on the completion of treatment. On re-examination at the end of two or three months five showed a slight increase in the cell count and five an increase above the original count. One case in this group died after the course of treatment was completed.

The author states that it is interesting to note that in 12 cases the clinical findings and the results of cerebrospinal fluid examination disagreed. Of those treated three had relapsed after having been treated with antrypol and trypanasamide two years previously. Two of these three cases showed no improvement but the third improved remarkably in all respects. Details are given of a few of the more interesting cases.

Some toxic manifestations followed injection of the drug in 36 cases. These were increased pulse rate feeling of beat all over the body itching nausea and vomiting giddiness and shivering. In a few

cases there was a slight fall in systolic blood pressure and one patient had complete collapse resembling surgical shock. He was almost pulseless for about a quarter of an hour but recovered rapidly. All these symptoms lasted only a few minutes and were less severe after successive injections.

The following are the conclusions —

The following facts are to the credit of pentamidine. It produces a rapid peripheral sterilisation of the blood and gland juice.

Treatment is complete in 10 days instead of 10 weeks as with other drugs available. This is extremely important from the point of view of the patient and for the preventive medical aspect.

Toxicity is low especially in comparison with trypanamide (which is responsible for many cases of blindness in Africa). The effective dose is not more than half the toxic dose and probably almost a fifth the lethal dose.

On the debit side are its lack of success when the examination of the CSF shows serious CNS involvement. When the cell-count in the CSF is above 80 per c.mm. it is probably safer to use one of the pentavalent arsenicals. Some cases with counts above that figure were cured but others were not.

It is not safe to base too much reliance on the analysis of a mere 53 cases but it does seem that this is probably the best drug so far produced for the early cases of sleeping sickness. If it is used however lumbar puncture should be done in all cases and no case with a CSF cell count of 80 per c.mm. or more should be given pentamidine unless it can be carefully followed up. Control differential white-cell counts during treatment are advisable but not absolutely essential if dosage is reasonable. It is not practicable to give exact dosage per lb. of body weight of the patient since in Africa treatment is often in the hands of people who cannot calculate such niceties. Our rough method probably suffices in all but the most civilized surroundings.

[It is very doubtful whether some of these conclusions are entirely justifiable. There is no doubt that the diamidines produce rapid peripheral sterilization as there is now abundant evidence on this point. There is however as yet little satisfactory evidence that the drugs are really of much use in patients with pronounced changes in the cerebrospinal fluid. Prolonged observation alone can decide this point and it is to be hoped that the author will be able to extend his observation period far beyond two or three months.]

W. Yorke

MAZZA (Salvador) BASSO (Cerminal) & BASSO (Redento) Investigaciones sobre enfermedad de Chagas. Enfermedad de Chagas en primer periodo diagnosticada exclusivamente por biopsia de ganglio linfático con hallazgo de parásitos leishmaniformes [Early Diagnosis of Chagas's Disease by the Finding of Leishmania Forms in Lymphatic Glands].—*Universidad Buenos Aires. Misión de Estudios de Patología Regional Argentina Jujuy. Publicación No 63 1942 48 pp. With 49 figs.*

Examination of sections of enlarged lymphatic glands made from biopsy specimens reveals leishmania forms of *T. cruzi*. This publication by Professor Mazza and his colleagues sets out an account of cases diagnosed in the early stages by these means and brings out the points with the wealth of detail that characterizes all articles associated with the name of the senior author.

Adenitis is associated with three stages of Chagas's disease (1) Affection of the gland in anatomical connexion with the site of primary infection (inoculation chagoma) (2) Satellite lymphatic dissemination around the primary lesion (metastatic chagomata) (3) Generalization in viscera and the lymphatic system (haematogenous chagomata)

The authors describe the histological findings in four patients whose histories are given later after the pathological description of the sections. The sections show by the excellently reproduced photomicrographs the condition of widespread histiocytosis the cells containing leishmania forms of *T. cruzi*; often in large numbers. These histiocytes may be single or may fuse to form giant cells. In other parts of the sections may be seen infiltration by polymorphonuclear cells swelling of the connective tissue and some free leishmania forms of the parasite. Similar photomicrographs are given of all four cases whose histories and clinical course are related in the final section of the article

H Harold Scott

LEISHMANIASIS

- 1 SWAMINATH (C S) SHORTT (H E) & ANDERSON (L A P) Transmission of Indian Kala Azar to Man by the Bites of *Phlebotomus argentipes* Ann and Brun—*Indian J Med Res* 1942 July Vol 30 No 3 pp 473-477
- 11 INDIAN JOURNAL OF MEDICAL RESEARCH 1942 July Vol 30 No 3 pp 479-480—The Transmission of Kala Azar

1 The experiments described in this paper resulting in the infection with *Leishmania donovani* of five volunteers upon whom infected sandflies were allowed to feed brings to a successful conclusion a series of investigations on the transmission of kala azar which were commenced in India 25 years ago

In the first place the sandfly *Phlebotomus argentipes* was brought under suspicion on the ground that its distribution corresponded with that of kala azar. This was followed by the demonstration that leishmania ingested by the sandfly developed into flagellates which multiplied in the stomach and in many cases extended forwards to the pharynx, buccal cavity and mouth parts. With such flies a few transmissions of infection to animals by bite were effected but positive results were so seldom obtained in the animals while they completely failed in human beings that it was felt that some essential factor must be missing. Finally it was discovered that if after the infective feed the sandflies were nourished on raisins instead of on blood as had been the custom hitherto there was a much greater development of flagellates with the result that in a considerable percentage of the flies there occurred a complete blockage of the pharynx with the multiplying organisms. With flies infected and maintained by this technique a new series of transmission experiments to animals was instituted with the result that transmission of kala azar by the bite of infected sandflies was successful in the case of the majority of the mice and hamsters employed [see this *Bulletin* 1941 Vol 38 p 256 1942 Vol 39 pp 447-449]

These successes encouraged further attempts to transmit kala azar to human beings. In a locality where kala azar does not occur five healthy volunteers who had never left the district were selected and on each were fed a number of sandflies which after their infective feed on a case of kala azar had been maintained on the raisin diet. The paper describes the infection of three of the five volunteers within a period of five to six months after the bites of the first batch of flies. In a footnote it is stated that since the paper was sent to press the remaining two volunteers had also been found to be infected.

The reasons for the past failures and the present successes are briefly discussed and it is suggested that two factors may have contributed to the positive results now obtained. The first of these is the effect of nourishing the flies on raisins instead of on blood and the second a possible greater virulence of the parasites involved in the final experiments.

The second paper is an Editorial Note in which are outlined the various stages in the investigation into the transmission of kala azar since its initiation in 1921 and the part played by the various investigators who were from time to time members of the Kala Azar Commission. A similar and more lengthy statement appeared in the *Indian Medical Gazette* (1942 August p. 483). Both of these articles are of considerable value for they have been written by those who are familiar with the work of the Commission from its commencement and are thus authentic records of the progress of the research, the discoveries which led to the final solution of the problem of transmission and the names of those who were concerned with its elucidation.

C. M. Henyon

CHUNG (Huei Lan). Localized Leishmaniasis of the Lymph Glands. With a Note by V. T. LIEU—*Chinese Med J* 1942 Jan-Feb Vol 61 No 1 pp 19-25. With 8 figs on 2 plates.

The case reported is that of a student in Peiping who complained of a small tumour in the mastoid region behind the left ear. It had been increasing in size for about a year when advice was sought. The tumour was excised and when examined was found to harbour leishmania. The student was then admitted to hospital and a thorough examination for kala azar made. It was not possible to demonstrate leishmania by liver or sternal puncture or by culture. He was discharged from hospital and kept under observation till readmission to hospital nearly two years later, suffering from pharyngitis and cough with slight temperature. The inguinal and epitrochlear glands were enlarged as they were at the time of the first admission to hospital. On this occasion a lymph node from the epitrochlear region was removed. Leishmania could not be detected in sections or smears but a hamster inoculated with an emulsion of part of the gland became infected. A further examination failed to reveal leishmania in any part of the body. A third admission to hospital was made a year and a half later and no new developments were found except for continued enlargement of glands (post auricular, submaxillary, cervical, epitrochlear, inguinal and hilar). Treatment with neostibosan was instituted. The conclusion reached is that owing to a good resistance the leishmania were localized in the regional lymph nodes and a visceral infection was prevented.

C. M. Henyon

CHUNG (Huei Lan) & CHOW (Hua K ang) A New Sodium Salt of Mannite Antimonio Acid in the Treatment of Kala-Azar in Chinese Hamsters —*Chinese Med Jl* 1942 Mar-Apr Vol 61 No 2 pp 73-76

The sodium salt of mannite antimonic acid containing 21 per cent of antimony is supplied by the manufacturers (Merck Shanghai) in 30 and 50 per cent solutions in 2 cc and 5 cc ampoules. It is relatively thermostable and can be sterilized at a temperature of 100 C without risk of decomposition. The solution can be injected intravenously, intramuscularly or subcutaneously. According to the manufacturers white mice, rabbits and dogs can tolerate intravenous injection of 0.3 cc, 20 cc and 40 cc respectively of the 50 per cent solution. The drug has been found effective against trypanosomiasis in white mice but the experiments reported in this paper are the first to be carried out with this drug in leishmaniasis. These were conducted on experimentally infected Chinese hamsters. It was found that the drug had a low toxicity and high curative value. In fact over three times the quantity of antimony can be administered in the form of this drug than can be given in solustibosan. With injections given twice daily a cure rate of 83.3 ± 15.2 per cent was obtained. This cure rate in experimental kala azar has never been achieved with any other antimony compound.

If given to hamsters in toxic doses it gives rise to a diffuse vacuolar degeneration of the liver parenchyma and renal tubules which is hydrotic and not fatty in character.

C M Wenyon

CHUNG (Huei Lan) WANG (C W) & LEL (C U) Solustibosan in the Treatment of Kala Azar —*Chinese Med Jl* 1942 Mar-Apr Vol 61 No 2 pp 77-82

The authors report the treatment of six cases of kala azar in Peiping with solustibosan administered either intramuscularly or intravenously. Generally 6 to 12 cc were administered on alternate days the total amount given varying from 60 to 162 cc. It is evident from the results obtained that the drug is as effective as ureastibamine or neostibosan but in terms of the antimony content the amount required to produce a cure is much larger. Of the 24 patients 22 were cured, one was resistant and one failed to complete the course of treatment. The drug is a colourless solution containing 20 mgm of metallic antimony per cc. Put up in ampoules it is stable, is of low toxicity and ready for administration either intramuscularly or intravenously.

C M Wenyon

COLF (A C E) Cutaneous Leishmaniasis in East Africa —*East African Med Jl* 1942 Sept Vol 19 No 6 pp 199-200

The author reports that several cases of kala azar apparently contracted in the region north of Lake Rudolph near the Omo river Abyssinia were admitted to a hospital in East Africa. Over half of the patients died but of nine who recovered five developed a papular nodular rash on the body most marked on the face. The nodules coalesced to form a warty mass on the face and a sort of reptilian

Immunity to typhus is very incompletely understood experiments on animals give only partial information *R. prowazekii* has a heat stable antigen which corresponds to the O antigen of *Proteus* X19 in giving rise to the same agglutination and complement fixation reactions but it does not stimulate opsonin formation CASTAÑEDA has shown that *R. prowazekii* has also a heat labile antigen which gives rise to the formation of opsonins protective against infection by the same organism This second antigen probably corresponds to the labile somatic or Vi antigen of the typhoid bacillus which alone effectively immunizes animals against the virulent Vi+O bacilli The O antigen of *R. prowazekii* can be assumed to act as an endotoxin in the same way as the O antigen of the typhoid bacillus on the other hand the heat labile antigen is not merely toxic it has also the property of inhibiting the interaction between the O antigen and the O antibodies and thus protects the Rickettsiae from the opsonizing and bactericidal action of the natural and immune O antibody

Attempts at chemotherapy have hitherto been unsuccessful in fact French workers with great experience of louse-borne typhus regard sulphapyridine as positively harmful There is no convincing evidence that human convalescent serum or animal sera have curative value presumably because no sera yet obtained have both of the antibodies that result from the response to the heat labile as well as the heat stable antigens In convalescent serum which cannot be obtained till two or three weeks after the end of the fever the O antibodies have already become greatly diminished as is shown by the fall in the OX19 titre The same thing happens in the case of sera from hyperimmunized animals even in the early stages of immunization the OX19 titre is low and it tends to fall during the period of rise in the titre of the neutralizing antibody

The author suggests that this difficulty may possibly be overcome by immunizing animals with the alkali stable O antigen of *Pr. OX19* which is believed to be common to *R. prowazekii* and *Pr. OX19* In collaboration with Dr G F PÉRIE he is at present engaged in immunizing horses on these lines and in three out of four animals the Weil-Felix titres have risen to between 1-20 000 and 1-60 000 It is hoped that clinical trials of this type of serum in combination with anti-Rickettsial serum will be made Tests cannot be carried out satisfactorily on experimental animals because these do not show toxic symptoms comparable with those seen in typhus patients

A typhus vaccine of maximum prophylactic value cannot be obtained till a number of important problems have been solved we do not know the best means of maintaining the labile antigen in Rickettsial cultures or the best methods of killing and preserving the vaccine Both phenol and formalin damage the labile Vi antigen of typhoid vaccine and the same thing may happen in the case of Rickettsial vaccines

Vaccines are ordinarily tested either by finding the immunizing response in guinea-pigs or by estimating the OX19 and neutralizing antibodies in the sera of inoculated persons All three tests ought to be employed

Tests of the OX19 agglutination response in volunteers recently inoculated with various vaccines have been carried out The results are shown in the Table A rise in the OX19 titre by 100 per cent has been regarded as a significant increase in the antibody content

TABLE III—Showing the *OX19* Agglutinin Response in Volunteers Inoculated with Various Typhus Vaccines (November 1941 to March 1942)

Vaccines			Volunteers Inoculated with from 1941 to March 1942)		
Batch	Prepared from Rickettsiae grown in	Prepared or Issued	Number Inoculated	Number and Percent age showing Signifi- cant Rise in O X 19 Agglutinin Titre	
				No	Percent
A	Yolk sac European louse borne strain	October 1940	68	3	4.4
B		May 10 1941	144	25	17.3
C		November 4 1941	125	62	49.6
D	Mouse lung Tunisian louse borne strain (Dr G M Findlay)	November 1 1941	16	3	18.7
E		Rat lung American murine strain	Date of expiry April 1943	12	0

It will be seen that striking differences occur in the O and X agglutination in these volunteers whereas all the rabbits gave a positive result with the same vaccines.

Neutralization tests

It will be seen that striking differences occur in the *O* antibody response in these volunteers whereas all the rabbits inoculated intravenously with the same vaccines responded with *OX19* antibody formation. Neutralization tests of the sera of the persons protected by the various vaccines are in contemplation.

In future it is likely that opsonin estimations will be employed to measure the response to the labile Rickettsial antigen because according to Castañeda the *O* antibody plays no part in the production of antibodies for *R. prowazekii*.

Weigl's louse vaccine and the Rocky Mountain spotted fever vaccine made from infected ticks have already given encouraging results but it is expected that vaccines made from Rickettsiae grown on animal tissues will prove equally effective.

[The existence of a typhus group of fevers was first suggested by the reviewer in a little known article in the *Indian Medical Gazette* dated January 1917. The words used were—There are seven described diseases which may be included in the typhus group of fevers and which have much in common with each other. These are Brill's disease, Rocky Mountain Fever, McNair's South African fever, MacKee's Kumaon fever with which my own case may safely be grouped, the macular fever of Tunisia and typhus fever. This and the later suggestion in 1921 that the fevers could provisionally be classified according to the arthropod vectors were made on purely clinical and epidemiological grounds at a time when no facilities were available in India for the Weil-Felix or other serological tests. A classification based on antigenic type will undoubtedly be adopted for the causal Rickettsiae but this will not necessarily be most suitable according to the vectors is being adopted to a steadily increasing degree and the author himself tacitly approves of the use of the vector's name in the nomenclature by calling classical typhus louse borne typhus. It is to be hoped that when the time is ripe for establishing a final nomenclature and classification the point of view of the clinician will be taken into account.]

John H. D. Megaw

BURNET (F. M.) The Rickettsial Diseases in Australia—*Med J Australia* 1942 Aug 22 29th Year Vol 2 No 8 pp 129-134

This is an interesting lecture in memory of BANCROFT who in 1876 discovered the adult worm *Wuchereria bancrofti*.

Rickettsial diseases are of minor importance in Australia where taken together they probably kill less than 20 persons yearly. Classical typhus is now unknown. Flea borne endemic typhus occurs in sporadic form especially in Queensland, South Australia and West Australia. Unfortunately the one large outbreak at Toowoomba in 1926 was not completely investigated; there were 200 cases with only four deaths, and there was a plague of mice at the time. HOWE in 1920 first described the disease in Adelaide and suggested that infection might have been derived from mice or rats.

Tsutsugamushi occurs in tropical Queensland. The author refers to the mysterious discovery of the Prolet's VA strain which was originally brought from London to Kuala Lumpur by KINGSBURY; it was supposed to be a strain of *Pr VI 9* but was found to be agglutinated by the sera of only those cases of typhus-like fever in which the reaction to *Pr VI 9* was negative. These were later found to be cases of tsutsugamushi to which the local names of scrub typhus and VA typhus were given. The mystery of the origin of the VA strain has never been solved; the discovery was a happy accident. In Queensland rats and bandicoots are the chief vertebrate reservoir of infection; in Japan field mice. *Trombicula deliensis* is perhaps the only vector of mite-borne typhus; the author inclines to the view that the larval mites which are believed to take only one blood feed transmit the virus through their eggs to the larvae of the next generation which then transmit infection.

Australia has no disease of the spotted fever group; the only tick-borne Rickettsial fever known in the country is Q fever first recognized about eight years ago among workers in a slaughter house in Brisbane. Cattle ticks are probably the vectors but in abattoir infection is believed to be acquired by inhalation of the dried faeces of infected ticks or possibly through the skin. In nature the cycle is probably bandicoot—*Haemaphysalis farrerosa* but the scrub tick *Ixodes holocyclus* with a wide range of hosts probably forms the link between that cycle and abattoir infection. Fever and headache are the only prominent features; there is no rash and infection does not spread from man to man. Bandicoots caught in the bush and ticks from these animals have been found to harbour the Rickettsiae. In Melbourne nine members of the laboratory staff have been infected with the disease; three of the attacks were moderately severe, the rest were sub-clinical. Infection is believed to have been caused by inhalation of infective dust which was probably liberated into the air while guinea-pigs' temperatures were being taken. *John B. D. McEwen*

FANTA (Helmut) & SILDEN (Hans) Ueber die Blutdruckverhältnisse im Gehirngefäßgebiet bei Fleckfieber. [The Blood Pressure in the Cerebral Arteries in Typhus Fever]—*Altna* Boch 1942 Oct 3 Vol 21 No 40 pp 551-553 With 1 chart

The blood pressure in the cerebral arteries is the same as that in the retinal arteries and so could be estimated by the method of

H K Muller A table shows representative findings in 11 patients who were in a state of stupor at the time of examination and in six patients whose mental condition was clear The range of the readings (in mm Hg) was as follows —

	Day of disease	Brachial artery		Retinal artery		Pulse
		Systolic	Diastolic	Systolic	Diastolic	
11 stuporose patients	6th to 10th	88-130	55-80	46-65	30-47	100-119
6 mentally clear patients	2nd to 12th	92-155	68-95	56-71	30-41	86-120
Normal readings for the retinal arteries				70-75	40	

Of the 11 stuporose patients eight gave systolic readings of 55 mm or less of the six mentally clear patients only one had a systolic reading of less than 66 mm

The brachial blood pressure was surprisingly little affected the systolic reading was less than 100 in only three of the stuporose patients and it was 112 or over in five of the six mentally clear patients The maintenance of the systemic blood pressure at these relatively high levels was believed to be due to the free use of cardio vascular tonics which included strophanthin cardiazol [septazol] and sympatol These drugs admittedly obscured the picture but the authors do not believe that they were in any way responsible for the low pressures in the cerebral arteries especially as these low pressures were still found in some convalescents in whom cerebral symptoms persisted for a considerable time after the omission of the drugs

There was a general degree of positive association between the severity of the cerebral manifestations and the degree of lowering of the retinal (and therefore cerebral) blood pressure The damage to the brain could not be explained on purely mechanical grounds toxic factors must have played an important part in its production

In convalescence there was usually a definite rise in the brachial and retinal blood pressure though the latter remained persistently low for weeks in the type of case already mentioned Sometimes the brachial pressure became unduly high in convalescence probably because of an excessive reactionary response on the part of the vegetative (sympathetic) nervous system as shown by the occurrence of tachycardia exophthalmos mydriasis tremor of the eyelids anginal pains sleeplessness etc

[As in most of the other German reports on typhus fever great emphasis is laid on the importance of cardio vascular tonics in treatment in fact the authors state that the interests of the patients completely precluded them from omitting these drugs for the purpose of finding the normal cerebral blood pressures in typhus fever No controlled tests seem to have been made to find whether there is a sound foundation for the firm belief in the efficacy of these drugs which is almost universally held by German physicians]

John W D Megaw
D2

MALY (G) Die Bedeutung der Weil Felixschen Reaktion beim Fleck fieber und die Behandlung desselben mit Rekonvaleszentenblut [The Significance of the Weil Felix Reaction in Typhus Fever and the Treatment of the Disease with Convalescent Blood—*Klinisch* 1942 Oct 24 Vol 21 No 43 pp 943-947 With 2 figs

The author claims that the Weil Felix reaction serves as an index of the degree to which the protective mechanism of the body is mobilized against the virus of the disease—it is not directly related to the activity of the virus. He regards a titre of 1-100 as suggestive of typhus and one of 1-200 as diagnostic.

The course of the reaction was closely followed in 100 patients. In 96 per cent of all the cases with classical symptoms the rise and fall of the titre conformed to a regular pattern. At the end of the first week the reaction was negative (or the titre was less than 1-200) in 58 per cent and positive in 42 per cent. At the end of the second week or early in the third week the titre reached its highest point, say 1-1 600 and often remained constant at this high level for about a week. Early in the fourth week, sometimes a little sooner, the titre fell to a lower level, such as 1-400 to 1-800. Exceptionally, in the sixth week there was a second rise in the titre. From the 15th to the 18th week there was still a fluctuating positive ranging from 1-200 to 1-800.

Four exceptional cases were seen—in two of these the highest titres 1-3 200 and 1-6 400 respectively were reached in the fourth week, in the third case which was severe the titre remained constant at 1-800 from the third to the sixth week, and in the fourth case an exceptionally mild one the titre was 1-3 200 on the 5th day, 1-1 600 on the 12th day, 1-200 on the 19th day, 1-800 on the 25th, 28th and 30th days, thereafter it varied between 1-200 and 1-400.

Of the 100 patients 60 had severe and 40 had mild attacks. The maximum titres are analysed in the following table—

	Titres of 1-800 and under	Titres of 1-1 600 and over
Mild cases	11 (27.5 per cent)	29 (72.5 per cent)
Severe cases treated with convalescent blood	11 (6 per cent)	31 (74 per cent)
Severe cases not treated with convalescent blood	14 (78 per cent)	4 (22 per cent)

These findings are regarded as showing that the titre of the reaction is related to the intensity of the defensive reaction of the body rather than to the severity of the infection. In very mild cases the reaction may even be negative because there is only a slight demand on the defensive response; in very severe cases the reaction may also be negative because the defences are overwhelmed so that no antibodies are formed.

Examples are given in support of this view. It follows that in cases with severe symptoms a negative reaction or a low titre agglutination is of bad omen. When death occurs in a case with a high titre response there is probably a special localization of the lesions which leads to damage of a vital organ such as the brain or heart.

The relatively high titres observed in the cases treated with convalescent blood are regarded as being due to stimulation of antibody formation

The importance of repeated tests at intervals of three days is stressed. In this connexion the various rapid tests are specially helpful because they can be carried out with one or two drops of blood obtained by pricking a finger or ear lobe. In doubtful cases the Rickettsia agglutination test is useful when available. In negative cases histological examination of an excised roseola of the skin is diagnostic in the hands of an expert.

Convalescent blood was used in the treatment of 42 of the severest cases in all of which recovery took place. The duration of the fever was not affected but the temperature usually fell by lysis and there was often a prompt improvement in the general condition of the patients. The blood of the donor was taken at a period of high titre response usually about four days after the end of the fever. Preliminary tests for syphilis and relapsing fever were carried out. Each dose was 20 cc of blood given by intramuscular injection and repeated once twice or three times at intervals of 24 hours.

In two cases intravenous transfusions of 100 cc of convalescent blood were given with excellent results but this method is attended with so many difficulties that it is impracticable except in well equipped hospitals.

The only drug mentioned with approval is adrenal cortical extract
John W D Megaw

VAN MEERENDONK (Piet) Erfahrungen ueber Fleckfieberbehandlung mit Atebrin und Calcium (Vorläufige Mitteilung) [Experiences in the Treatment of Typhus Fever with Atebrin and Calcium]—*Deut Militärarzt* 1942 Sept Vol 7 No 9 pp 541-542

The author claims to have demonstrated that a combination of atebrin and calcium is a specific treatment for typhus fever. He had already treated about 225 cases with atebrin alone but although there was a reduction by about one-third in the case mortality rate in persons aged 30 to 45 there were a good many cases with severe cerebral symptoms and several patients died after the end of the fever. In most of the fatal cases the post mortem finding was encephalitis thus and the occasional occurrence of a haemorrhagic rash indicated severe damage to the blood vessels especially the capillaries. It was also noticed that the staining caused by atebrin was much more pronounced than in patients treated for malaria with the same doses of the drug. The author concluded that there must be a deficiency in the blood calcium and this view was promptly confirmed by the results which followed administration of calcium. All the severest cases in the 20 to 40 age group [number not stated] treated with calcium responded with a prompt fall in the temperature and none of them died. Severe cerebral symptoms and deafness ceased to occur the rash disappeared much earlier than in previous cases and never became haemorrhagic. Yellow staining also was much less.

Two examples are given of immediate response to the treatment. The calcium content of the blood in typhus patients was then estimated it was found to be as low as 6 milligrammes per cent. It was also noted that patients treated with calcium never had the abnormally low blood pressures which are so striking a feature of the disease and that cardiovascular tonics were seldom needed.

The association between calcium deficiency and circulatory disturbances is stated to be one of cause and effect. It was therefore concluded that whereas atabrin acts on the causal organism, calcium controls the organic changes occurring in the disease.

The treatment consists of one tablet of atabrin (0.1 gramme) thrice daily and at least 10 to 20 cc. of a 20 per cent solution of calcium gluconate or if this is not available of a 10 per cent solution of calcium chloride once daily. In severe cases doses of as much as 40 cc. of one of the solutions were given daily. [Presumably by the intravenous route the maximum B.P. dose of calcium chloride by this route is 1.0 gramme.]

[In view of the reduction in the calcium content of the blood treatment by calcium appears to have a rational basis. Neither this paper nor the previous one by the same author [see this *Bulletin* 1942 Vol. 39 p. 679] contains evidence to justify the statement that atabrin acts on the causal organisms. There were no proper controls; we only have the author's opinion that the attacks would have been more severe but for the special treatment that was given.]

John H. D. Meade

STEINHAUS (Edward A.) *Rickettsia* like Organism from Normal *Dermacentor andersoni* Stiles.—*Public Health Rep.* 1942 Sept. 11 Vol. 57 No. 37 pp. 1375-1377

The ticks from which this *Rickettsia* has been recovered had for several generations been reared in the laboratory. In many feeding experiments they had never given rise to any disease in rabbits or guinea-pigs. The *Rickettsia* is most abundant in epithelial cells of the intestinal diverticula but not in the nuclei. The organism is described. It has been established in fowl embryo culture but has not grown on any of the large number of artificial media tried.

The *Rickettsia* occurs in the same species of tick as the morphologically similar *Rickettsia* of Rocky Mountain fever but there is no cross immunity between the two or between this *Rickettsia* and that of Q fever. The name *Rickettsia dermatophila* is suggested.

C. H.

BRIGHAM (George D.) & WATT (James) Additional Highly Virulent Strains of Rocky Mountain Spotted Fever Virus isolated in Georgia.—*Public Health Rep.* 1942 Sept. 4 Vol. 57 No. 36 pp. 1342-1344

Most strains of the *Rickettsia* of Rocky Mountain fever isolated in the Eastern United States have been markedly less virulent for guinea-pigs than those commonly found in Montana but there have been reports of the isolation of highly virulent strains in Washington [this *Bulletin* 1940 Vol. 37 p. 843] and Georgia [*ibid.* 1941 Vol. 38 p. 682]. The authors now report the isolation of four strains in Georgia: two from pools of *Dermacentor variabilis* taken from animals at a farm where a fatal case of Rocky Mountain fever had occurred and two from the blood of two patients with the disease. Three of these strains were studied and compared with the previously isolated highly virulent strains. The scrotal reaction was constant in inoculated guinea-pigs; the fatality rate was high in these animals. By cross immunity tests the strains were proved to be identical with previously isolated strains and typical lesions of Rocky Mountain fever were found in the brains of guinea-pigs.

In three human cases associated with these strains the Weil Felix reaction with *Proteus OX19* test was positive in two (1 in 1 280 and 1 in 640 dilutions respectively) and negative in the third C II

DE SILVA (Stanley) A Ten Day Fever simulating Typhoid—Indian
Med Ga 1942 Sept Vol 77 No 9 pp 532-533 With
1 chart

Ten cases of pyrexia of unknown origin in Colombo are briefly reported. The onset was sudden without chill the temperature remained high for three to five days then fell by gradual lysis. The average duration of the fever was 10 days the temperature invariably reaching normal on the tenth day. In one case the temperature rose to 101.8 F for a few hours on the 23rd day. There was neither rash nor any other special feature. Agglutination tests for *Bact typhosum* *Bact paratyphosum* A B and C and for *B. columbiensis* [*B. columbense*] were negative in every case. Clot cultures were made in five cases and stool cultures in four all were negative. The Weil Felix test was done in two cases and proved negative [presumably only *Proteus OX19* was used]. The average white blood count was 8 200 the lymphocytes were 40 per cent. Rapid recovery followed in every case. [No epidemiological data are given except for the remark that the disease did not appear to be very infectious. These may possibly have been cases of one of the Rickettsial infections in which *Proteus OX19* is not agglutinated.]

John H D Megau

PLAGUE

WOLL (Aristides A) & O LEARY (Shirley) Plague in the Americas
XI Mexico—*Bol Oficina Sanitaria Panamericana* 1942 Sept
Vol 21 No 9 pp 874-883 With 1 map & 1 chart [Refs in
footnotes]

VI Mexico—Mexico qualifies with the United States as the only two North American countries known to have suffered an invasion of plague. The figures for Mexico are a total of about 868 cases with 590 deaths in the two main periods 1902-3 and 1920-23. These are represented in some 17 foci radiating from the three seaports Mazatlan Veracruz and Tampico. As usual for the history of original plague invasion at a seaport there is uncertainty about the mode of entry. Plague entered Mexico through Mazatlan in 1902 probably from San Francisco. The disease was at first thought to be a rare and malignant form of malaria. Some 8 000 or 9 000 persons fled the city and the epidemic lasted from October 20th 1902 to March 17th 1903 when the last human case occurred. The total number of cases reported was 475 with 69 per cent mortality. Plague appeared next officially in Veracruz on the other side of the country but not till 1920 in which year also it was reported in Tampico. In this outbreak the last sporadic cases of human plague were recorded in 1923. Anti plague campaigns were instituted and followed the usual lines—compulsory notification capture and destruction of rodents isolation of cases disinfection and deratization cyanide fumigation quarantine and inspection of travellers vaccination and serum therapy. Most of the cases were bubonic. In Tampico

where 156 cases were studied the percentages were bubonic 84 septicaemic 13 pneumonic 2 and carbuncular 1 while the case mortality for the bubonic plague throughout the country was 63-77 per cent which is rather high
W F Harley

SCHWARZ (Ernst) Notes on Commensal Rats—*Amer J Trop Med* 1942 Sept Vol 22 No 5 pp 577-579

The author points out that in American literature the rat usually referred to as *R rattus alexandrinus* is in fact *R rattus frugivorus*. The under side of *frugivorus* is white or lemon yellow sharply set off from the back that of the true *alexandrinus* is grey passing gradually to the brown of the back. Both of these exist in the United States.

R r rattus and *R r alexandrinus* are primarily house rats but *R r frugivorus* tends to nest in trees. Control measures usually taken are effective against *R norvegicus* *R r rattus* and *R r alexandrinus* but may miss *R r frugivorus*.

In East Africa rats of the Nile valley Lake Victoria Lake Tanganyika and the Ituri forest regions are descended from *R r alexandrinus* since the construction of the Uganda railway these rats have spread towards the coast. Rats of Indian origin have been carried inland from the coast and *R r kandianus* (*verruhinus*) has been found at Nakuru and Kisumu. It is known that in East and South Africa and in Egypt the wild rodents are infected with plague but human plague in these areas is chiefly found where the commensal rats are infected. Direct transmission from wild rodents to man is rare.

The paper ends with remarks on the importance of identification of ship rats and the aid this may give in the tracing of the origins of epidemics.
C H

JORDAN (Harl) On the Siphonaptera collected by Dr J M de la Barrera in the Province of Mendoza during 1939—*Rev Inst Bactiológ* Dr Carlos G M Ibr n Buenos Aires 1942 June Vol 10 No 4 pp 401-460 With 34 figs

HENNESSEY (R S F) Pneumonic Plague—*East African Med J* 1942 Sept Vol 19 No 6 pp 183-190

In the nine years since 1933 there have been 38 autopsies on patients dying of primary pneumonic plague. In 26 cases the condition was true lobar pneumonia not confluent bronchopneumonia in 11 of the remainder it was the classical haemorrhagic bronchopneumonia. It is necessary to emphasize this fact lest the pathologist taking the classical haemorrhagic bronchopneumonia of plague as his guide decide against the diagnosis of *P pestis* infection. Fulminating plague and virulent plague generally give rise to bronchopneumonia which at the time of death has scarcely passed the stage of red hepatization. We may assume therefore that in view of the occurrence of extensive and advanced lesions of the lobar type the strains of *P pestis* in circulation in the Kampala District of Uganda are of reduced virulence. Pneumonia is also a terminal event in bubonic and septicaemic plague. In that case the mechanism of production would seem to be either a pneumococcal bronchiolitis followed by a secondary invasion of the damaged lung tissue by *Pestis* via the blood stream or an embolic deposition of the organism in the lung tissue with extension to bronchi and a generalized bronchopneumonia.
W F Harley

CHOLERA

PANJA (G) A New Method of Isolation of Vibrios from Cholera Stool —
Indian J Med Res 1942 July Vol 30 No 3 pp 391-396 With 1 fig

During a search for filter passing vibrios in cholera stools it was found that vibrios would grow through an L3 candle into surrounding peptone water much earlier than such organisms as *Bact alkaligenes* motile coliform organisms and late lactose fermenters. This finding has been put to practical use in the isolation of cholera vibrios and the procedure has been greatly improved by adding boric acid to the peptone water which caused inhibition of growth of coliform organisms but not of vibrios. The acid in a strength of 0.08 per cent was added to the peptone water and pH adjusted to 9. A small amount of the stool is mixed with the peptone water and partly aspirated through the candle into the surrounding boric peptone water by vacuum action. A pure growth of vibrios was found in most of the samples after 18 to 20 hours incubation. The candle must of course be tested for porosity and leakage before use. This method which gave an 87 per cent success as against 44 per cent by direct bile salt agar plating does not differentiate between Inaba or Ogawa subtypes or El Tor and non cholera vibrios. A figure in illustration of the apparatus is given

W F Harvey

BACILLARY DYSENTERY

PAULLEY (J W) Treatment of Bacillary Dysentery in the Middle East — *Lancet* 1942 Nov 21 pp 592-594

BUTTLE in experiments *in vitro* failed to find any difference between the bacteriostatic effect of sulphaguanidine and sulphapyridine against dysentery organisms. In comparing the effects of treatment with these sulphonamides cases were drawn from an area of a few square miles in the Middle East over the period April to July 1942. Most were mild a few moderate or severe.

They were divided into groups according to the treatment given —

- (1) Salines plus sulphaguanidine whenever necessary
- (2) Sulphaguanidine
- (3) Sulphapyridine
- (4) Kaolin

All were seen and treated within one or two days of onset.

The patients all passed blood and mucus and were diagnosed on the exudate in the faeces though the rate of isolation of dysentery bacilli was low. Most were Flexner a few Shiga Schmitz and Sonne.

In 60 cases treated with salines supplemented later with sulphaguanidine the average period in bed was 12.6 days. In 25 treated with sulphaguanidine only the period was 5.36 days. In two groups of 43 and 30 treated with sulphapyridine it was 4.26 and 4.96 days. In 15 with kaolin the average was 6.1 days. In an outbreak of severe Shiga dysentery the average periods in bed were 5.7 days in 15 treated

with sulphapyridine and 8.01 in 13 with sulphaguanidine. It is therefore concluded that treatment with sulphonamides proved superior to other methods but that sulphapyridine possesses advantages over sulphaguanidine.

It is necessary that sulphonamide treatment should be initiated in the acute stage. When sulphaguanidine is scarce there is a good case for the use of sulphapyridine though there is certainly more danger of agranulocytosis and this necessitates making leucocyte counts if the drug is given for longer than 4-5 days. No patient in this series required sulphapyridine for a longer period than four days. The advantages of sulphonamide treatment in bacillary dysentery are the speed of recovery and the fact that solid food can be taken early and the patient does not require prolonged convalescence.

One patient developed haematuria after 2½ days of sulphapyridine. The drug was immediately discontinued but the dysentery was cured. Haematuria cleared in three days on fluids plus massive alkali treatment by the mouth.

It was therefore decided to prescribe Pot cit grains 40 two hourly in the initial stages for all patients passing a large number of stools on admission. It is important that a daily urinary output of 1500 cc should be maintained and it is probable that a reaction of pH 11 is necessary before crystallization of sulphonamide can be averted with certainty.

P. Ma ison Bahr

COLE (Seymour L.) Sulfa-guanidine Toxicity — *Jl Amer Med Assoc*
1942 Sept 19 Vol 120 No 3 pp 196-197

The occurrence of severe reactions due to sulphaguanidine has not hitherto been recorded but that the clinical use of this drug is not without hazard is shown by the following case. The diagnosis of ulcerative colitis was made in a woman and treatment with sulphaguanidine was instituted. The first dose was of 0.1 gm per kgm body weight. The succeeding doses were of half this amount and were administered every four hours. On the ninth day after having taken 110 gm the patient complained of severe headache and nausea. At this point the drug was discontinued.

The following day the patient's temperature previously normal was 104°F and there was a diffuse morbilliform rash on the body and limbs. The urine contained many crystals of sulphaguanidine and the blood contained 2 mgm of sulphaguanidine in 100 cc. The patient looked extremely toxic and in spite of high fluid intake secreted little urine. Under the continued regimen of forced fluids however the temperature fell in a few days to normal and the rash disappeared.

It is regarded as possible that the drug was absorbed more rapidly through the ulcerated areas of the large intestine than would be the case with an intact mucous membrane and this should be taken into consideration in determining the amount of sulphaguanidine to be administered to patients with ulcers in the gastro intestinal mucosa.

C. H.

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

BERKMAN (J M) & BARGEN (J A) Amebic Abscess of the Liver with Choledochal and External Fistulas Report of Case—*Proc Staff Meetn_gs Mayo Clinic* 1942 Sept 9 Vol 17 No 31 pp 481-487 With 1 fig

The patient whose record is cited here is a physician of 42 years who apparently contracted amoebic dysentery in 1925 this was followed by a large indolent rectal abscess which was drained. In the meantime he had established the diagnosis by demonstration of *E histolytica* in the faeces. Symptoms being controlled by emetine injections and stovarsol he was believed to be cured and a quiescent period of eight years ensued during which he was free from obvious intestinal disturbance. The pyrexia lassitude night sweats and increasing pulmonary symptoms forced him to enter hospital where on account of a leucocytosis of 19 000 a retrocaecal appendix abscess was suspected and the appendix removed. During convalescence signs of liver abscess became apparent. The pyrexia yielded temporarily to heroic doses of emetine but his condition remained unsatisfactory.

On admission to the Mayo Clinic in April 1941 he had slight pyrexia but all routine laboratory tests were negative except for increased blood sedimentation rate. The leucocyte count was well within normal limits. An exploratory laparotomy revealed a liver abscess in the lower aspect of the right lobe beneath the attachment of the suspensory ligament which yielded 1200-1500 cc of thick yellow pus. *E histolytica* was found in the exudate on the 13th day of drainage. Emetine hydrochloride 1 gr was instilled into the sinus from time to time and usually caused a severe reaction. By October 1941 he had taken altogether 120 gr (8 gm) of emetine. In spite of intensive emetine therapy a further laparotomy was undertaken in January 1942. The abscess cavity contained more pus it was widely opened drainage tubes were inserted and the cavity irrigated with 2 per cent chiniofon (quinoxyl). No form of anti amoebic treatment was subsequently given until April 1942 when it was noted that the drainage was bile tinged.

On injection of the sinus with opaque medium it was found that a direct connexion existed from the abscess cavity to the common bile duct and hence into the intestine. It was then decided to press anti amoebic treatment regardless of risk. Finally in July 1942 the sinus tract closed. More than 194 gr (12.9 gm) of emetine hydrochloride had been administered.

[This account illustrates the necessity of treating amoebic dysentery radically from the commencement] P Manson Bahr

RELAPSING FEVER AND OTHER SPIROCHAETOSIS

ROBINSON (G G) The Relative Toxicity of Rotenone and Pyrethrum in Oil to the Argasid Tick *Ornithodoros moubata* Murray—*Bull Entom Res* 1942 Dec Vol 33 Pt 4 pp 273-281 With 3 figs [15 refs]

In laboratory tests in which known amounts of rotenone in various media and Pyrethrum in a medium petroleum oil were sprayed under

standard conditions upon *Ornithodoros moubata* it was found that rotenone is far less toxic to this tick than an equal weight of pyrethrin I. The author concludes that Pyrethrum is therefore more economical to use than Derris as a contact insecticide for *Ornithodoros*. It has been difficult to find a suitable solvent for rotenone but it is here shown that it is highly soluble in cresols, xlenols and phenols and that such solutions may then be diluted with mineral and vegetable oil. Rotenone does not deteriorate if stored in the dark in these mixtures. Medium petroleum oil leads to much more rapid penetration by the insecticide than vegetable oils such as ground nut oil [cf. this Bulletin 1942 Vol 39 p 847 1943 Vol 40 p 89] V B Wiglesworth

ROBINSON (G G) Fertility in the Argasid Tick *Ornithodoros moubata* Murray—*Parasitology* 1942 Nov Vol 34 Nos 3/4 pp 308-314 [12 figs]

DAVIS (Gordon E) *Ornithodoros parkeri* and Relapsing Fever Spirochetes in Southern Idaho—*Public Health Rep* 1942 Oct 2 Vol 57 No 40 pp 1501-1503

In a relatively restricted area in southern Idaho there is a very heavy infestation of *Ornithodoros parkeri* in ground squirrel and prairie dog burrows and an unusually high incidence of spirochetes.

Of a total of 1 466 ticks collected 1 98 were tested in 163 sublots 69 of which were positive for spirochetes.

This is the heaviest infestation of *O. parkeri* thus far encountered in any one area in the nine States (Wyoming Colorado Utah Montana Washington Oregon Nevada California and Idaho) in which this species has been collected with the possible exception of an isolated area in central California. The number of spirochete strains recovered far exceeds all others.

Relapsing fever has not been reported from this area.

DAS GUPTA (B M) *Spirillum minus* Infection Acquired from an Indian Squirrel (*Sciurus* sp.)—*Indian Med Gaz* 1942 Sept Vol 77 No 9 pp 541-542 With 1 chart

The record of a typical case of rat bite fever in a boy 12 years old following a bite on the finger by an Indian Squirrel (*Sciurus* sp.).

The patient developed an attack of fever about two weeks later but did not come under the author's observation until after about six weeks. Blood taken from the patient was then inoculated into two guinea-pigs and four young mice. One of the guinea-pigs and three of the mice became positive for *Spirillum minus* after unusually prolonged incubation periods (15 to 26 days). After one injection of 0.3 gm novarsenobillon the patient's fever disappeared and a second dose of 0.45 gm a week later prevented any relapse. E Hindle

LEPROSY

SCHNEIDER (Kurt) Einiges ueber das Memeler Lepraheim und die Lepraendemie im Kreise Memel [Leprosy in the Memel Region]—*Deut Med Woch* 1942 June 12 Vol 68 No 24 pp 615-617

The author deals with the prevalence of leprosy in the Memel region. The early history of infection through a Lithuanian servant girl in 1848 is referred to. The disease was still endemic in 1899 when a leper home was opened for the isolation of 16 patients who since 1893 had been isolated in cottages. In 1909 the beds were increased to 22 and later the number rose to 28 since 1920 no new cases have occurred. Details are given regarding five infected areas which are of local interest but show that the disease largely died out leaving a few old cases still in the leper home. Recently these numbered seven four from the Memel area two Lithuanians and one from Brazil. Isolation of the infective patients is enforced but bacteriologically negative ones may be allowed to reside in hygienic houses. Various remedies have been tried and chaulmoogra oil has some beneficial effect but X rays were found to be harmful. No benefits were observed from the use of vitamin B₁ in nerve cases.

L. Rogers

FERNANDEZ (Jose M. M.) & OLMOS CASTRO (Norberto) La reacción precoz provocada por la lepromina. Investigaciones efectuadas con diversos antígenos derivados del *Mycobacterium leprae* [The Early Lepromin Reaction. Study of Antigens obtained from *Mycobacterium leprae*]—*Rev Argentina de Dermatofilologia* 1942 Vol 26 Pt 3 pp 556-580 With 11 figs [17 refs] English summary

This is a comprehensive and well thought out article dealing with several points each of which might form the subject of a separate contribution. The authors write first of the early reaction following injection of whole lepromin in lepers in those in contact with lepers and in persons thought to be healthy. In this section they refer to previous work [see this *Bulletin* 1940 Vol 37 p 632] this will be referred to again later in this abstract. They then define their terminology and record the results in lepers contacts and the healthy. They next give an account of their investigations into lepromin filtrate the method of its preparation characters of the reaction and the results of its use in the same three classes of subjects. Thirdly they carried out analogous tests using tuberculin and other antigens and pass on to consider the work of LOWE and DHARMENDRA [this *Bulletin* 1942 Vol 39 pp 227-228] and the sensitization of non leprosy persons with whole lepromin. Such is the general scheme of this article and on each of these points more details must be given.

In a study of the intradermal injection of lepromin in 1940 the senior author showed by tests on 312 patients and 250 contacts that (1) Twenty four hours after injection in positive cases an erythematous infiltration showed itself reaching its acme in 48 hours beginning to decline in 72 hours and disappearing in a week when the later Mitsuda reaction began. (2) Early and late reactions are both positive in 92 per cent of cases of leprosy. (3) Use of a filtrate of whole lepromin

gives in certain cases the early reaction but the later nodular reaction fails to appear. (4) This latter reaction is not a non-specific one because it is seen only in those who react to whole lepromin.

The authors define whole lepromin (lepromina integral) as the antigen which contains all the constituents of a leproma—bacteria cells tissue detritus. By bacillary lepromin they imply an antigen of a suspension of bacilli obtained by the method of MONTANES or some similar process. Purified lepromin proteins are the soluble active substances of *Mycobacterium leprae* obtained by filtration or chemical extraction containing no acid fast bacteria. The reactions produced are of two types, the early erythematous infiltration mentioned above and the later papular or nodular three or four weeks later. The following is a brief account of the authors' results with these various antigens tested on the different groups of subjects.

1. Whole Lepromin

Early Reactions in Lepers and Contacts—Their later investigations have confirmed the authors' previous findings that a positive early reaction is never seen in a lepromatous case—that in most allergic cases both reaction early and late occur and correspond in intensity—that some do not give an early response but show a moderate or weak late reaction—and lastly they have never seen a case of early positive response with negative late reaction.

Early Reactions in Subjects believed to be Healthy—Two hundred and fifty seven children from 3 to 15 years of age in an orphanage were inoculated with whole lepromin—of these five (1.9 per cent) gave the early reaction and 98 (38.1 per cent) the late third week reaction. Clinical examination of the five early reactors revealed in four of them a scar of the residual tuberculoid type—evidence of an old infection. Among 120 adults supposedly free from lepra infection two gave the early reaction. Seventy two of these were observed for the late reaction and 58 (80.5 per cent) were positive.

11. Lepromin Filtrate

The mode of preparation of this is important and is given as follows. Nodules rich in bacilli are cut small, boiled for 30 minutes in water to remove the epidermis, then reduced to a paste by grinding in a mortar, distilled water is added 10 cc. for each gramme of the fresh nodule and made into a smooth paste in a mortar and then filtered through gauze and the filtrate passed through a filter candle L3. The filtrate from this is concentrated at 58°C. to one tenth of the original suspension so that 1 cc. represents 1 gm. of the nodule. It is then placed in ampoules and sterilized by heating in the autoclave for half an hour at 120°C. For injection 0.1 cc. is used.

The reaction begins to be visible within 24 hours and reaches a maximum in 48 hours as an erythema round the point of injection 10–30 mm in diameter very like the Mantoux reaction. It then begins to fade and in a week is recognizable only as a dark pigmented spot.

Reaction in Lepers and Contacts—In 50 patients with the lepromatous form the reaction was negative as it was also with whole lepromin. Of 55 with the tuberculoid form 30 gave the early reaction, none the late reaction, whereas the same fifty gave the early response to whole lepromin and 53 the late reaction.

Of 25 contacts 18 gave an early (48 hours) response 18 gave the early response to whole lepromin and 21 the late
Reaction in Supposed Healthy Subjects—Of 103 of these one was positive with early response whereas to whole lepromin one gave the early and 39 the late

iii *Early Reaction in Individuals Sensitized to Mycobacterium tuberculosis and other Antigens*

The authors state that positive reactions occur in tuberculous persons not suffering from leprosy. The other antigens used were Treis of lymphogranuloma inguinale and Dmelcos of soft chancre. The results were negative in all [but only eight of the former and two of the latter were tested]

The investigations of LOWE and DHARMENDRA are referred to and discussed but these have already been abstracted in this Bulletin [1942 Vol 39 p 227]

iv *The Sensitization of Non Leprous Persons by Means of Whole Lepromin*

On the hypothesis that the early reaction was due to previous sensitization by toxins or antigens of *Mycobacterium leprae* the authors aimed at provoking sensitization of persons believed to be free from leprosy by intradermal inoculation of whole lepromin. One group of 15 healthy adult women were injected intradermally with whole lepromin and another with the filtrate. None gave the early reaction but 13 gave the late reaction to the former (whole lepromin). Twenty five days after the first injection lepromin filtrate was injected three gave a definite early response two a doubtful or weak positive ten were negative. In other words an early reaction was obtained with the filtrate in three at least of the fifteen who had previously given a negative response to whole lepromin.

Using Dharmendra's protein antigen in 61 adults believed to be free from leprosy and who had never had injection of whole lepromin 7 gave a frank positive and 3 others a weak positive reaction. Of another 37 adults believed to be free from leprosy but who had had one or more injections of 0.1 cc whole lepromin Dharmendra's antigen produced positive reactions in 30 or four fifths of the subjects. Five had had their injections of whole lepromin 3 years before and three of them were positive two negative three had had it one year before two were positive twenty six had had it 2 months before and 23 were positive and of three who had had the injection only one month before two were positive.

To epitomize the authors state The results of the early reaction to whole or integral lepromin coincided in the great majority of cases (94 per cent) with those of the late nodular reaction in lepers and contacts. Both reactions were negative in the lepromatous forms of the disease frequently positive in the neural forms and more so in the tuberculoid variety. In healthy people both reactions frequently gave diverging results the early reaction was usually negative (98.03 per cent) while the Mitsuda reaction was frequently positive (38.13 per cent). These persons could be sensitized by intradermal injection of a sufficiently active integral lepromin antigen and a large number of positive early reactions were then observed.

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Reaction in Lepers and Contacts—In 50 patients with lepromatous form the reaction was negative as it was also with whole lepromin Of 55 with the tuberculoid form 50 gave the early reaction none the late reaction whereas the same fifty gave the early response to whole lepromin and 53 the late reaction

Of 25 contacts 18 gave an early (48 hours) response 18 gave the early response to whole lepromin and 21 the late

Reaction in Supposed Healthy Subjects—Of 103 of these one was positive with early response whereas to whole lepromin one gave the early and 39 the late

iii *Early Reaction in Individuals Sensitized to Mycobacterium tuberculosis and other Antigens*

The authors state that positive reactions occur in tuberculous persons not suffering from leprosy. The other antigens used were Freis of lymphogranuloma inguinale and Dmelcos of soft chancre. The results were negative in all [but only eight of the former and two of the latter were tested]

The investigations of LOWE and DHARMENDRA are referred to and discussed but these have already been abstracted in this *Bulletin* [1942 Vol 39 p 227]

iv *The Sensitization of Non Leprous Persons by Means of Whole Lepromin*

On the hypothesis that the early reaction was due to previous sensitization by toxins or antigens of *Mycobacterium leprae* the authors aimed at provoking sensitization of persons believed to be free from leprosy by intradermal inoculation of whole lepromin. One group of 15 healthy adult women were injected intradermally with whole lepromin and another with the filtrate. None gave the early reaction but 13 gave the late reaction to the former (whole lepromin). Twenty five days after the first injection lepromin filtrate was injected three gave a definite early response two a doubtful or weak positive ten were negative. In other words an early reaction was obtained with the filtrate in three at least of the fifteen who had previously given a negative response to whole lepromin.

Using Dharmendra's protein antigen in 61 adults believed to be free from leprosy and who had never had injection of whole lepromin 7 gave a frank positive and 3 others a weak positive reaction. Of another 37 adults believed to be free from leprosy but who had had one or more injections of 0.1 cc whole lepromin Dharmendra's antigen produced positive reactions in 30 or four fifths of the subjects. Five had had their injections of whole lepromin 3 years before and three of them were positive two negative three had had it one year before two were positive twenty six had had it 2 months before and 23 were positive and of three who had had the injection only one month before two were positive.

To epitomize the authors state. The results of the early reaction to whole or integral lepromin coincided in the great majority of cases (94 per cent) with those of the late nodular reaction in lepers and contacts. Both reactions were negative in the lepromatous forms of the disease frequently positive in the neural forms and more so in the tuberculoid variety. In healthy people both reactions frequently gave diverging results the early reaction was usually negative (98.05 per cent) while the Mitsuda reaction was frequently positive (38.13 per cent). These persons could be sensitized by intradermal injection of a sufficiently active integral lepromin antigen and a large number of positive early reactions were then observed.

A filtrate of integral lepromin produced the same early reaction as integral lepromin in patients contacts and healthy persons. This antigen did not produce a late nodular reaction. The antigen prepared according to Dharmendra's technique (soluble proteins of *Mycobacterium leprae*) gave similar results to those obtained with the filtrate.

H. Harold Scott

DIXON (H. B. F.) Clinical Lecture on Leprosy with Notes on Three Cases amongst Maltese Troops — *Jl Roy Army Med Corps* 194 Sept Vol. 19 No 3 pp 118-137 With 1 chart

FOX (Howard) A Case of Leprosy of Sixty One Years Duration — *Arch Dermat & Syph* 1942 Oct. Vol 46 No 4 pp 53-553 With 1 fig

IGNACIO CHALA (José) Sulfuro de antimonio coloidal en la lepra [Colloidal Antimony Sulphide in Leprosy] — *Rev Facul de Med Bogota* 1942 July Vol 11 No 1 pp 1-12 With 3 plates

Salts of antimony, especially the tartrate, have been used in the treatment of the leprous reaction. The author here reports the results of using the isotonic colloidal sulphide Stibicol in treatment of the disease itself. Stibicol contains in each cc 0.002 mgm of antimony in the metallic state. It is given in doses of 2 cc injected intramuscularly or deep subcutaneously every three days till 12-14 doses have been given. Then after an interval of two weeks another series is started. Tolerance was perfect, there were no cases of colloidoclastic shock, but care was taken to exclude any nephritic patients from the treatment.

Three cases are described in detail. The first was a man of 22 years with tuberculoid leprosy and maculae on face, arms and legs and patches of hypoaesthesia on the limbs. Treatment was started on March 6th 1941 and he had seven series of injections. On the 22nd July 1941 the maculae had gone except for slight prominence and bacteriological examination was negative. When he was seen again a year later the improvement had been maintained. [It is a little difficult to reconcile the recorded points here. For a single course of 12-14 injections, one every three days, 5-6 weeks would be needed, that is with the two weeks interval, 7-8 weeks before the second series of injections would be started. Seven courses would thus take 40 weeks or more. From March 6th to July 22nd is two days short of 20 weeks.]

The second case was in a man of 41 years with rhinitis, maculae and infiltrations of face, forehead, neck, back, trunk, thighs and legs and scattered patches of anaesthesia. He received six series of injections starting on August 20th 1941 and by May 1st 1942 the rhinitis and maculae had disappeared and bacteriological examination of the nasal mucus and of gland smears was negative for Hansen's bacillus.

The third patient was a man of 40 years with scaly erythema and nodules of the face, neck, thorax and legs and patchy anaesthesia. He was given three series of intramuscular injections, each of 2 cc, three times a week with an interval of 20 days between the series. Six months after beginning the treatment it was reported that the maculae had almost gone, the sensory changes were no longer present and the infiltrations were obviously better.

[In spite of the extensive lesions in each case the patients seem to have come under treatment early for the history states clearly that the first aged 22 was 22 years old when the initial lesion presented itself the second was 41 years of age and the first lesion was observed when he was 41 years 4 months old The third aged 40 noticed the initial lesion six months before None of these patients had had any other treatment The number of injections in each case fluctuated between 65 and 90 [but the third can have had only 42 at the most and perhaps only 36 according as his course was 14 or 12 injections]

[The method is worthy of further trial but the discrepancies shown in this record lead one to doubt and anyway no generalization can be based on so few cases]

H Harold Scott

HELMINTHIASIS

SCHWETZ (J) & DARTEVELLE (E) Sur les mollusques gastéropodes pulmonés et la schistosomiase de l'Est du Kivu Ituri et spécialement dans l'agglomération de Kasenye au Lac Albert [On the Pulmonate Gasteropod Molluscs and Schistosomiasis of the Eastern Side of the Region between Lake Kivu and the River Ituri and especially in the Villages of the Kasenye Region on Lake Albert]—*Ann Soc Belge de Méd Trop* 1942 June 30 Vol 22 No 2 pp 123-156 With 2 maps & 3 figs [11 refs]

During the work of the malaria mission of the Belgian Royal Colonial Institute in 1939 Schwetz studied the molluscs of this region and Darteville identified the species collected They were not able to stay long in most of the districts studied their stay in the Kasenye region where they worked for 10 days in October at the end of the dry season and before the rains was their longest stay in any one place VAN DEN BERGHE studied the molluscs here for six weeks during June and July 1936 BECQUAERT is the only other worker who has studied them Schwetz and Darteville regard their results as preliminary only and plead for an extended study lasting a year and including both wet and dry seasons

The study is important because bilharzia is common all over the eastern border of the Belgian Congo and especially at Irumu and Buna in the Upper Ituri region and in the region of the mines of Kilo and on the shores of the Bay of Bobandana (Lake Kivu) They studied the Kasenye region more especially but the distribution of the disease elsewhere needs investigation

It has been thought that the fisheries in Lake Albert near Kasenye are responsible for most of the cases because fishermen are presumably in contact with water contaminated by the intermediate hosts of *Schistosoma* but the lake fishing is done with nets in deep water and little fishing occurs in the creeks etc along the lake shores where the molluscs that probably transmit the disease abound [but see SCOPES below] Further Schwetz and Darteville found that the miners of Kilo were at least as heavily infected with *Schistosoma* as the fisherfolk Of the adult men examined at Kilo who had nothing to do with water or the lake 40 per cent had *S. mansoni* notably fewer of the women and adolescents were infected SCOPES has shown that about 50 per cent of the men and women workers alike in the

village were infected and that the percentage in the fisherfolk is never higher than that of the other workers. Thus the fisheries are not the chief source of the disease. The main sources seem to be the rivers and creeks where little fishing is done.

The rivers Kisegge, Ndiggi, Sabe and Mwyta were investigated in the Kasenya region. The River Kisegge resembled all the other rivers of this region in being dry in October when it was examined except for collections of water still left after the dry season. These were used by the natives as sources of drinking and washing water. Near the lake the river became marshy with many aquatic plants and a small lagoon. The flat sandy and muddy shores of Lake Albert in the Kasenya region give place in the north to higher steep banks and to the south to marshy shores covered by vegetation and reeds. The bay of Kaseke is shallow and covered with aquatic plants and harbours many molluscs.

A list is given of the six species of Planorbis found between Lake Kivu in the south and the Upper Ituri and Lake Albert in the north. These are —

P. choanomphalus and *P. stanleyi* in the semi-lacustrine focus at Bobandana (Lake Kivu)

P. adourensis at Irumu and in the Mongwalu region (Upper Ituri)

P. boissyi, *tanganikanus*, *P. choanomphalus*, *P. (Gyraulus) natalensis* and *Segmentina kanisacensis* at the most important focus of the disease at Kasenya (Lake Albert). The minute species *Gyraulus natalensis* predominated greatly over all the others.

A list is also given of the other gastropods and of the Lamellibranchs found.

VAN DEN BERGH in the subsequent discussion pointed out that *Gyraulus* and *Segmentina* are very abundant in the estuaries and near marshy banks of lakes and on the stalks of aquatic plants above the water so that the ecology differs essentially from that of *Planorbis*. He collected thousands in a few minutes on Lake Kisele in 1933 and at Kasenya in 1936. They have never been proved capable of transmitting schistosomiasis. He searched hundreds of them in vain for trematodes. He was able however to transmit *S. mansoni* to monkeys and mice by means of *P. adourensis* which he found at Kasenya in 1936.

Schwetz and Dartelle think that all these species may transmit schistosomiasis except the minute species of *Gyraulus* and *Segmentina*. They could not find cercariae in *Gyraulus natalensis* or *P. choanomphalus* in the brief time available but they did find them in *P. adourensis* in the Mongwalu region. Until the results of a prolonged study of the molluscs during both the dry and the wet seasons are available the only prophylactic measure possible is treatment of the patients although this will not prevent infection. G. Lapeere

SCOPS (Ch). Note au sujet de la bilharziose dans la plaine de Kasenya (Lac Albert). [Note on Schistosomiasis in the Plain of Kasenya (Lake Albert)].—Ann Soc Bel e de Med Trop. 1942. June 30. Vol 22 No 2. pp 155-160.

In 1937 Scops examined 30,000 natives of the Gety Bogoro-Boga plateau. The preliminary results of a second examination in 1938 showed that 65 per cent of the people examined had intestinal

bilharziasis In 1939 a further examination was made Two tables show the very high incidence in the various localities investigated in August 1938 and in June 1939

In 1938 the average percentage of people infected among those examined was men 46 per cent of 161 examined women 27 per cent of 148 examined children 15 per cent of 169 examined In 1939 the corresponding figures were men 34 per cent of 979 examined women 30 per cent of 431 examined children 10 per cent of 609 examined Out of 2 597 people examined 690 (26 per cent) were infected

Not only the natives but also strangers travellers and business men especially those associated with the fisheries were infected The high incidence among children is explicable by their preference for aquatic games The natives infect themselves by contact with the lake water especially at the mouth of the River Semliké (between Lakes Edward and Albert) where they walk in the muddy stagnant water to fish or by washing in or drinking the water of the River Kisege (Lake Albert) and its tributaries which is used by all the natives for these purposes [cf SCHWETZ and DARTEVELLE above] These are the two main sources of the infection in this area Schwetz during the subsequent discussion said that he could not confirm this

Prophylactic measures suggested are the treatment of the infected patients prevention of fishing by them until they are cured destruction of the molluscs of the River Kisege interdiction of all fishing at the mouth of the Semliké and the provision of a European doctor to investigate the whole problem

A third table shows records of the number of natives in whom *Ascaris Trichuris Taenia* and ankylostomes were found in 1939 This shows that *Ascaris* is the next most frequent helminth after *Schistosoma* both in children and adults The highest incidences of it were 44 per cent in men 40.8 in women and 44 per cent in children in different localities The strange fact was that ankylostomiasis was very rare or absent only one case being noted During the subsequent discussion Schwetz agreed with this but VAN DEN BERGHE pointed out that Scops had not used floatation methods which are necessary to reveal hookworm eggs although he thought that they do not reveal schistosome eggs so well as examination in water or saline van den Berghe had found that 7 per cent of examined persons were carriers of the eggs of *Necator americanus* at Kasenyi and 40 per cent at Irumu where the low nocturnal temperature kills the larvae in faecal cultures By numerous autopsies done at Elisabethville in 1933 he had found to his surprise only a few specimens of *Necator americanus* in the duodenum often less than 10

G Lapage

DAVIS (George Bertram) Observations on the Facial Appearance in Cases of Bilharziasis—*Trans Roy Soc Trop Med & Hyg* 1942 Aug 31 Vol 36 No 2 pp 117–120 With 4 figs & 1 diagram

Young natives not under five years old and not over 14 show very often a facial appearance characteristic of bilharzia namely loss of subcutaneous fat definitely localized in the region of the horizontal ramus of the mandible This makes the outline of the face when it is seen from the front run straight down to a point in front of the angle of the lower jaw and from there straight to the chin or with a slight

convexity upwards between the angle of the lower jaw and the chin owing to the indrawing of the tissues round the middle of the lower jaw. The result is a triangular appearance of the lower half of the face instead of the evenly rounded contour of this part of the normal face. The author's photographs illustrate this well.

This bilharzia face can be a useful aid to diagnosis but it cannot be relied upon by itself. Using it during the examination of natives in kraal schools (in Rhodesia) the author found that in one series of 133 children between 5 and 14 correct diagnosis was indicated by the bilharzia face in 83.4 per cent i.e. 94 showed the bilharzia face and had eggs in the urine and 12 showed the normal face and had no eggs in the urine. In another series of 1006 in which the age of the patients was not taken into account 67 per cent showed correct results (bilharzia face with eggs in the urine in 622 cases, no bilharzia face and no eggs in the urine in 52 cases).

Many subjects showing no bilharzia face with eggs in the urine were below the age of four years or over 14. In a child under four years wasting of the chubby face is difficult to see and at the age of 15 the face is beginning to lose its fat.

It is possible that in cases with bilharzia face and no egg in the urine further examination would have shown the presence of eggs or that these cases had been treated and the face had not had time to recover or that the infection was at its earliest stage when the bilharzia face is very difficult to detect.

The author's investigation revealed 90 per cent of cases of bilharzia in 2000 native examined in Southern Rhodesia (Metemwa).

G. Lapeere

BRAUNE (Johann Friedrich) Ueber die Verhütung der Bilharziose unter Feldzugsbedingungen insbesondere ueber die Gewinnung von zerkarienfreiem Wasch und Badewasser. [On the Prevention of Schistosomiasis under Campaigning Conditions especially on the Provision of Washing and Bathing Water Free from Cercariae.] *Deut. Trop. Ztschr.* 1942 Aug 15 Vol 46 No 16 pp 409-426 [14 refs.]

In areas where bilharzia exists all water should be regarded as dangerous but in war only simple measures for rendering it safe which need little transport and labour can be applied. Prevention of the entry of the cercariae into the skin is then more important than killing the snails, prevention of the fouling of water by faeces and urine or treatment of personnel with antimonial preparations.

Two chlorine preparations both available in powder or tablet form and both stable were tried and both were shown to be effective. The two preparations were (1) Clorna previously called Hydrosept a chloramine preparation (p-toluolsulfonchloramide of sodium) its formula is given, it is very stable, easily soluble in water and contains about 25 per cent of active chlorine and (2) Caporit which is calcium hypochlorite containing 70-75 per cent of active chlorine. It is stable, can be kept dry for several months without marked loss of chlorine and readily dissolves in water.

These were both tested in Hamburg tap water and in the dirty water of the Elbe against cercariae of *Schistosoma mansoni* obtained by experimental infestation of *Planorbis guadeloupensis* in the Hamburg Tropical Institute.

It made little difference whether tap water or Elbe water was used although the cercariae died rather more quickly in the chlorinated Elbe water. Stirring helps the lethal action. All the experiments were done at 20-24 C at 29-30 C which is nearer tropical temperatures no significant difference in the times required to kill the cercariae was noticed.

Following the work of KLEPETARS acid was added to quicken the action of Clorina. Citric and tartaric acids were used experiment having shown that these did not in the concentrations used damage the cercariae. In practice hydrochloric or other cheaper acids could be used. Results with both citric and tartaric acids were the same.

Clorina in a concentration of 1 gm per 10 litres (the author calculates the capacity of a wash basin as 4-6 litres and a bucket as 10-12 litres) of Elbe or tap water with the addition of 1 gm of citric or tartaric acid killed all the cercariae within 10 minutes. The same result followed when 0.5 gm clorina with 2 gm citric or tartaric acid was used but the former is better because it uses less solid material and gives the added safety of a chlorine content twice as high. If the acid is left out a substantially longer time is required (0.5 gm Clorina in 10 litres then required 125 minutes).

Caporit has a higher chlorine content and worked as well in weaker solutions. 1 gm of Caporit freeing 100-200 litres of tap or Elbe water within 10 minutes and 200-500 litres within 15 minutes. Its action did not begin to fall off until the sixth day. It requires no acid. It is thus more useful for larger quantities of water. A tablet of 0.1 gm is enough for a bucket or basin.

All the experiments were done in glass vessels and probably apply to basins, baths and other containers with solid walls but collections of water in the open were not tested. In these vegetation, bacteria and organic matter would probably reduce the action of the chlorine.

Neither Clorina nor Caporit in relatively strong solutions (1 gm Clorina and 1 gm citric acid in 10 litres of water or 1 gm Caporit alone in 100 litres) could kill *Bulinus contortus* the intermediate host of *S. haematobium* or an unidentified species of *Planorbis* after 18 hours.

The Sertz filter layers in the German Army Knapsack Filter cannot be penetrated by cercariae. In 108 litres of water pumped through this filter after three litres of water heavily contaminated with cercariae had been pumped through it no cercariae were found. The dangers of infection when using the filter or when cleaning it are pointed out.

The concentration of both Clorina and Caporit which will kill cercariae will also kill the bacteria in drinking water. G Lapage

MAZZOTTI (Luis). La cuti reacción y la intradermo reacción aplicadas en un caso humano de *Fasciola hepatica*. [Cutaneous and Intracutaneous Tests in *F. hepatica* Infection]—*Rev Inst Salubridad y Enfermedades Trop.* Mexico 1942 Mar Vol 3 No 1 pp 53-55. English summary.

Cutaneous and intracutaneous tests in a patient infected with *Fasciola hepatica* gave positive results.

Intracutaneous tests using the same antigen were negative in six patients with onchocerciasis and one patient infected with *Taenia saginata*. [The antigen was an extract of *F. hepatica*.]

CHEN (H T) The Metacercaria and Adult of *Centrocestus formosanus* (Nishi ori 1924) with Notes on the Natural Infection of Rats and Cats with *C. armatus* (Tanabe 1929) — *Jl Parasitology* 1942 Aug Vol 28 No 4 pp 285-298 With 12 fig on 1 plate [19 refs]

The author worked on material collected in the Kowloon area of Hong Kong. He briefly outlines the history of the genus *Centrocestus* and describes the metacercaria in detail. Earlier descriptions of it have been brief. The metacercarial cysts occur most often attached to the gill filaments of four freshwater fish *Macropodus opercularis*, *Puntius semifasciolatus*, *Carassius auratus* and *Visgurnus anguilla caudatus* but are also found in the stomach wall and muscles of a common frog *Rana limncharis* and of a common toad *Bufo melanostictus*. A list of other fish hosts in Formosa, the Philippines and Hong Kong is given.

The adult was obtained experimentally in the small intestine of white rats, mice, rabbits, cats and dogs. To these hosts may be added *Nycticorax nycticorax* in Formosa and *Bubulcus ibis coromandus* and *Pyrreroides manilensis* in the Philippines and in Hong Kong chickens and ducklin. Descriptions of the adult are available only in Japanese but the author gives a full description elucidating some obscure points.

The diagnosis of the three known species of *Centrocestus* (*C. armatus*, *C. formosanus*, *C. cuspidatus*) is discussed, the egg being the most reliable feature for determining these. Existing data cannot decide the optimum normal definitive host. More adults were recovered by the author from rats than from the other hosts that he used but this does not necessarily mean that rats are the optimum hosts. There is some evidence of acquired resistance to the parasite.

The discovery of the metacercariae of *C. formosanus* in frogs and toads shows that Heterophyid metacercariae hitherto known only from fish can infest other hosts also. This makes it necessary to revise the family Heterophyidae Ohdner 1914 and the subfamily Centrocestinae Looss 1899.

It may also have public health importance provided that it can be shown that the metacercariae infest edible frogs such as *Rana rufo-losa*. The author has good reason to believe that *R. rufo-losa* may be involved and is investigating the question further. The danger is the greater because frog meat is most delicious when it is cooked in a lightning manner. The only fish involved in this area so far are all small and are not used as food.

Centrocestus is transferable to man and may have been overlooked because it is so small ($461 \times 917 \mu$) and because its eggs resemble those of common human flukes e.g. *Clonorchis sinensis*. G. Lapan.

RICARDO BENAVENTE (Grces) Contribución al tratamiento de los quistes hidatídicos pulmonares con pncm torax pre-operativo (método de Arc) [Treatment of Pulmonary Hydatid Cysts by Pre-operation Pneumothorax] — *Rev Med d Cal* 1942 May Vol 70 No 5 pp 344-362 With 8 figs [36 refs]

HU (Stephen M K) Studies on the Susceptibility of Shanghai Mosquitoes to Experimental Infection with *Microfilaria malayi* Brug VII *Culex fuscus* Wiedemann — *Chinese Med Jl* 1942 Mar-Apr Vol 61 No 2 pp 94-97

1. The susceptibility of *Culex fuscus* to infection with *Microfilaria malayi* has been confirmed.

2 Of 68 *Culex fuscanus* fed on two cases of *Microfilaria malayi* infection 2 or 29 per cent were found with mature filarial larvae in them

3 Fourteen of the mosquitoes were found with only dead encapsulated microfilarial form larvae while the remaining 53 mosquitoes were negative for any filarial larva

4 *Culex fuscanus* is not likely to play a significant role in the transmission of *Microfilaria malayi* infection in the lower Yangtze region because in this part of the country it seldom enters houses or feeds on man

DAMPF (Alfonso) La Carretera Panamericana y el problema de la oncocercosis [The Pan American Highway and the Problem of Onchocerciasis]—*Bol Oficina Sanitaria Panamericana* 1942 Aug Vol 21 No 8 pp 703-708 With 1 map English summary

Among other problems that will arise from the construction of numerous means of communication over the American continent are medico-entomological ones. Remote places will be placed in contact with the advantages and disadvantages of civilization and diseases transmitted by insects that are confined to such districts will suddenly make contact with other populated areas creating new foci and new problems.

A typical example is the construction of the Pan American Highway crossing Mexico from Nuevo Laredo to Suchiate and passing through or near foci of onchocerciasis. This disease occurs in two Mexican States Oaxaca and Chiapas elsewhere in America it occurs only in Guatemala its focus of origin. The author has shown that Simuliidae exist not only in the affected areas but also in other parts of Mexico especially along the rivers of the plateau of the Gulf of Mexico and the Pacific. The spread of onchocerciasis is thus an international problem.

The map published shows the Pan American Highway. The primary focus of onchocerciasis in Oaxaca State is so far from the Highway that it is no danger to travel but the Highway virtually passes through two foci of the disease in the State of Chiapas and thus also happens in Guatemala. The Simuliidae occupy in all the four foci areas more extensive than those occupied by the disease there is imminent danger of the extension of the disease not by the infected Simuliidae but by carriers of the microfilariae using the new means of communication.

None of the three known vectors of onchocerciasis (*Simulium ochraceum*, *S. callidum* and *S. metallicum*) has been found in the isthmus of Tehuantepec and they are absent from the area between the Oaxaca focus and those in the States of Puebla and Veracruz. They have not been studied over those parts of the Highway which run to Matamoros in Puebla to the interior of Oaxaca State or down from the Oaxaca plateau to the isthmus. Investigations are required of the Simuliidae of the western Sierra Madre Range of the States of Michoacan Jalisco and Nayarit.

Onchocerciasis will certainly spread by the Highway if precautions are not taken not only in the Mexican Republic but also in the Central American States. Travel by the Highway does not involve any danger to white men because states the author they apparently have a

partial immunity to onchocerciasis and must live a long time in an infected area and suffer a large number of bites of Simuliidae to be infected.

Although onchocerciasis does not endanger the life of the patient nor decrease during the first years of the disease his capacity for work it requires the State to maintain an expensive medical service which increases with the spread of the disease. The disease will eventually spread to such vast areas that it will be difficult to extirpate (cf VAN DEN BERGHE this *Bulletin* who says that it cannot now be eliminated from Africa (Belgian Congo) because the bites of Simuliidae cannot be avoided and vast reservoirs of *Onchocerca* exist in man, buffalo and antelope). The Public Health authorities of Mexico and Guatemala began some years ago a well planned campaign and recently established a medical investigation centre at Huixtla, Chiapas State with a special hospital, but these efforts are local and further organizations are required.

The author advocates supervision of the movements of the population and the establishment of a well-equipped laboratory in a centre of onchocerciasis in Oaxaca or Chiapas preferably in collaboration with scientific bodies in Guatemala and the United States. The disease may appear any day in the United States. The Simuliidae should also be studied.

A method of treating with creolin streams infested with Simuliidae is described. A barrel of this delivering 1 drop per second for 24 hours maintained a concentration of 1 in 20 000 for at least 10 km. If this were applied during the dry season in the region of the Sierra Madre of Chiapas when the number of little streams is insignificant whole areas could be sterilized at little cost. Repetition of it twice more with an interval of 15 days would eliminate larvae born after the first treatment and also females which cannot reproduce. The method is not possible during the wet season.

The author thinks that Mexico and Guatemala can be freed of *Onchocerca volitans*. In Chiapas State it affects some 20 000 people and in Oaxaca some 11 000.

G. Lapage

RAO (S. Raghavender). Some Epidemiological Factors of Guinea Worm Disease as Noticed in a Recent Survey of the Osmanabad District.—*Jl Indian Med Assoc* 1942 Aug Vol 11 No 11 pp 329-337. With 4 figs, 2 charts & 1 map.

A survey of guinea worm disease in the Osmanabad district was made from the middle of April to the middle of July 1937. Villages to be surveyed were selected in such a way as to give a fair sample of the social, environmental and physical characteristics of the districts. House-to-house visits were made to record particulars of the age, sex, caste, occupation, appearance of the first symptoms, situation and number of the worms, number of attacks, movements of the patients during the two years before the attacks and the source of the drinking water. Two towns only had a modern water scheme supplying chlorinated water. The wells were examined for Cyclops. The physical features, climate and water supplies of the district are described.

The incidence of the disease for the whole population of the district is 28.9 per mille; it varied between 11.8 and 42.3 per mille; in one village it was as high as 155 per mille. Persons aged between 11 and 20 years showed the highest incidence, more than 50 per cent of the

patients were aged 11-30 years. Out of 3 129 cases 2 056 were males and 1 073 females. Thus disparity occurs in villages where the infection is endemic but it is greater in villages where the infection is imported from other villages than in those where it is endemic. Young adults were more often attacked and children under one year were free.

One attack does not confer any immunity, the author thinks that it renders the patient more susceptible. Nearly 67 per cent of the 3 129 had had more than one attack. 388 had had more than 10 attacks during 10 or more years. The highest number of attacks noted in any one individual was 50.

A table records the number of worms found. Some cases had 15 or 20 worms but 2 086 had only one. Most worms were found in the lower extremity. A large number were found round the ankle joints. The next most frequent site was the leg and the feet also were affected. When more than one worm was present the thigh was affected. When the worm emerged at the knee ankylosis might result if sepsis occurred. The arm and the forearm were the commonest sites in the upper limb. In the trunk the worms most often appeared on the abdomen, a few appeared on the back or chest. In a few they appeared on the external genitalia of both sexes. It is noted that the working members of a family may be disabled at a time of the year when their labour is badly needed in the fields.

Of the 434 wells examined 158 (mostly step wells) contained Cyclops. Wells were treated with 50 grains of slaked lime per gallon of water in the well but Cyclops always reappeared in these. Experiments were done to find the best quality of lime. Surti quicklime was the best.

More than 80 per cent of the population of this district have had the disease at one time or another. The illness usually lasts about a month but if sepsis occurs it may last several months and deformities may result. The disease generally begins in October, reaches its maximum in March and by July new cases are hard to find, although chronic cases occur throughout the year in endemic villages.

For the prevention of the disease Rao recommends a permanent water supply for all places with a population of over 500, the substitution of draw wells for step wells, the disinfection of these wells every month between August and April and the breeding of fish in them which will eat Cyclops (difficult because many wells dry up during the summer).

G Lapage

HOSFORD (George N.) STEWART (M. A.) & SUGARMAN (Edward I.)
Eye Worm (*Thelazia californiensis*) Infection in Man—*Arch. Ophthalmology* 1942 June Vol 27 No 6 pp 1165-1170

This paper reports the second known case of infection of man with the Spirurid nematode *Thelazia californiensis*, a parasite which is also found in the dog and in sheep and deer. The authors think that this infection may be commoner than the records of it indicate.

The patient was a policeman who complained of ocular fatigue and photophobia and a sensation of something moving about in his left eye. One worm was easily removed from the upper temporal quadrant of the bulbar conjunctiva. Five days later five more worms were removed from the same eye. All were females, greyish white in colour.

and 10-12 by 0.5 mm in size with visible transverse striations. Seven months later the eye showed no abnormality. There was no eosinophilia.

The worms are not under the conjunctiva so that they can be easily washed out. The use of cocaine is unnecessary and may prevent the movements of the worm so that they may be missed. They must be distinguished from *Orchocerca rostratus* which is 2-3 times as long and is transmitted by the bites of species of *Simulium* and from *Loa loa* which is 3-7 times as long, has no visible striations and occurs beneath the conjunctiva.

There are 20 species of *Thelazia*; they lay embryonated eggs in the lachrymal duct, conjunctival sac, eye or nictitating membrane of mammals and birds. Usually they occur in both eyes in their normal host but are unilateral in all cases known in man.

The only other case known of human infection with *T. californiensis* occurred in a Californian medical practitioner but four cases are known of human infection with the allied species *T. callipaeda*, all of them from China. This species is found in the dog, cat, rabbit and monkey; it causes little conjunctivitis but markedly stimulates tear production, intense pain and severe nervous symptoms have been reported; the cornea may become opaque, scarification and subsequent ulceration of the cornea may be caused.

T. californiensis is known in man only in California where infection is acquired in hilly mountainous districts covered with brush. Infection probably occurs only during the summer. The authors think that the worms appear in the eye 3-4 weeks after infection. The life history is not known but presumably an arthropod intermediate host is involved.

G. Lapeere

MARBLE (A.), SKOOG (A. P.) & BUCHOLZ (D. J.) Trichinosis. Report of an Outbreak at Camp Edwards, Massachusetts—*Med. Surgeon* 1941 June 1, 60, No. 6, pp. 636-643.

This paper is reviewed in *Bulletin of Hygiene* 1943 Vol. 18, p. 125.

McCoy (O. R.) The Incubation Period of Trichinosis—*American Journal of Tropical Medicine* 1941 July Vol. 22, No. 4, pp. 313-317. With 1 fig. [12 refs.]

This paper is reviewed in *Bulletin of Hygiene* 1943 Vol. 18, p. 128.

SÄETH (H.) Die Trichinose. Nach Beobachtungen an mehreren Gruppenerkrankungen. [Observations on Trichiniasis in Several Groups of Patients.]—*Deutsche Medizinische Wochenschrift* 1941 Sept. 11 Vol. 68, No. 37, pp. 912-916. With 2 figs. [10 refs.]

This paper is reviewed in *Bulletin of Hygiene* 1943 Vol. 18, p. 126.

REIMANN (H.) Elek. bei Trichinose. [Electrocardiograms in Trichiniasis.]—*Deutsche Medizinische Wochenschrift* 1941 July Vol. 7, No. 7, pp. 448-454. With 6 figs.

This paper is reviewed in *Bulletin of Hygiene* 1943 Vol. 18, p. 128.

DEFICIENCY DISEASES

ALWALL (Nils) Ein Beitrag zu der Frage ob Ascorbinsäure im Überschuss beim Menschen Pellagra auslösen kann [A Contribution to the Question whether Excess Ascorbic Acid can induce Pellagra in Man]—*Acta Med Scandinavica* 1942 Mar 3 Vol 110 No 1 pp 22-31 With 5 figs

The present investigation was undertaken to test the statement reported by SALVESEN that vitamin C in excessive doses induces skin changes of the same type as occur in typical pellagra.

The patient was a 39 year old woman with pronounced symptoms typical of pellagra including psychic disturbance anorexia dermatitis stomatitis glossitis genital and rectal affections of the mucous membrane and constipation. Six days after she arrived at the clinic she was given 0.10 gm nicotinamide four times daily by mouth. After four days there was a distinct improvement in her condition particularly in the mouth lesions. The nicotinamide was then reduced to two doses daily and in addition a tablespoonful of dry yeast was given daily for three weeks. After six weeks all the symptoms of pellagra had disappeared and she was given over a period of 62 days an average of 1.6 gm of ascorbic acid daily. In spite of the fact that the patient sat in the open each day exposed to the sun and later to ultraviolet light indoors there were no signs of the recurrence of any of the symptoms. The findings of Salvesen (who gave only 0.4 gm ascorbic acid daily for two weeks) were thus not confirmed. G. E. Glock

ANJMED (N) Pellagra In the Upper India Provinces—*Jl Indian Med Assoc* 1942 Oct Vol 12 No 1 pp 1-6 With 8 figs on 2 plates

A description of three cases and a discussion of aetiology and treatment

SPRUE

STANNUS (Hugh S) Sprue—*Trans Roy Soc Trop Med & Hyg* 1942 Nov 30 Vol 36 No 3 pp 123-150 [118 refs]

Dr Stannus brings forward another theory as to the aetiology and pathogenesis of sprue which is best given in his own words—

A Criticisms are offered upon theories previously enunciated concerning the causation of sprue and upon some of the observations upon which they are founded.

B An attempt is made to suggest the lines along which a solution of the problem may lie.

C Evidence is adduced in favour of a theory based upon the partition hypothesis which predicates for unsplit (neutral) fat and for fatty acids a different mode of absorption from the intestine a different route after absorption a different composition during transport a different destination and a different rôle in the bodily metabolism.

D The theory now tentatively put forward regarding the pathology of sprue enlists the following considerations—

(1) The deficient absorption of fat is limited primarily to loss of power to absorb the fatty acid moiety and cholesterol.

The author ends naively *Se non é vero é bene trovato* [if not true it is very ingenious]
H. Harold Scott

HAEMATOLOGY

NAYAR (Sushila) Cholesterol and Anaemia — *Indian Med Ca* 1942
 Aug. Vol 77 No 8 pp 459-469 [31 refs]

The author confirms the findings of previous workers that the average blood cholesterol concentration of normal Indians is lower than that of Europeans and that it is reduced in anaemias of various types and in infections.

An attempt was made to assess the therapeutic effect of intramuscular injections of cholesterol solutions in 51 cases of anaemia, mostly macrocytic anaemias of pregnancy. It was concluded that cholesterol is not effective as a substitute for liver therapy in the macrocytic anaemias nor for iron in the microcytic types.

The author considers that there are grounds for thinking that cholesterol may exert some adjuvant action when administered together with liver or iron.
L. J. Davis

VAN DEN BERGHE (Louis) Contribution à la connaissance de l'hématologie normale des indigènes du Congo Belge. Premier mémoire le sang [Haematology of Normal Natives of the Belgian Congo I. The Blood] — *Ann Soc Bel e de Méd Trop* 1941 Dec 31
 Vol 21 No 4 pp 375-395 [28 refs]

The author working in the Belgian Congo records the peripheral blood findings obtained in a study of 80 apparently normal natives. The subjects comprised 10 pygmies, 30 negroes living at an altitude between 1800 and 2000 metres and 40 negroes of various tribes serving prison sentences. The latter group had been treated for intestinal parasites but the former two groups while apparently healthy were harbouring various blood and intestinal parasites.

Haemoglobin value and red cell counts revealed mean figures about 25 per cent below those recorded in Europe except in the high altitude group.

Leucocyte counts showed a general leucopenia with considerable variation in the individual counts. Differential counts revealed a relative granulocytopenia with a shift to the left and an increase in eosinophils. Price Jones curves showed an increased mean cell diameter compared with European figures which the author considers to be due to a racial factor.

Platelet counts were normal except among the pygmies who displayed a thrombocytopenia.

Bleeding times, clotting times and reticulocyte counts were within normal limits.
L. J. Davis

CABRERA CALDERÍN (J. G.) SCULL (J. M. Labourette) & BARRERAS (L.) Paroxysmal Painful Crises with Abdominal Predominance in Sickle Cell Anemia — *Archivos Med Infantil* Havana 1942 Apr-May & June Vol 11 p 61 [Summary taken from *Jl Amer Med Assoc* 1942 Sept 19 Vol 120 No 3 p 243]

Cabrera Calderín and his collaborators report the case of a Negro girl aged 11 who entered the hospital with acute abdominal symptoms.

The symptoms subsided and the girl was dismissed. One week later she had another abdominal crisis and was again sent to the hospital. Several examinations including roentgenoscopy of the vertebral column were negative. The blood count disclosed 2 450 000 erythrocytes 26 000 leukocytes 40 per cent hemoglobin and fulcular erythrocytes of sickle cell anemia. The attacks were interpreted as lumbo-abdominal crises of sickle cell anemia. Blood transfusion produced great improvement. The painful crises subsided but pressure still elicited pain in the epigastric and lumbar regions. Several days later the girl had severe pain in the right elbow. This pain ceased following a blood transfusion and application of heat. Anderson and Ware ascribe the pain to splenic infarcts stretching of the splenic capsule being the cause of pain. The articular pains are due to osseous changes. Examination of the blood is of greatest importance in the differential diagnosis because otherwise sickle cell anemia might be mistaken for hemolytic jaundice ovalocytic anemia. Lederer's syndrome acute hemolysis or Cooley's anemia. Blood transfusions and liver therapy are helpful in the treatment. Possibility of sickle cell anemia should be considered in Negro patients or in half breeds exhibiting anemia and abdominal crises.

VENOMS AND ANTIVENENES

KELLAWAY (C H) The Symptomatology and Treatment of the Bites of Australian Snakes—*Med J Australia* 1942 Aug 29 29th Year Vol 2 No 9 pp 171-174

This was given as a post graduate lecture but as the subject is not only of much interest but also one about which little is known to the general reader it demands and merits detailed abstract.

The dominant action of Australian snake venoms is neurotoxic partly central to which the nausea vomiting faintness and drowsiness are due partly peripheral with paralysis of sensory and proprioceptive nerve endings and a curare-like action on motor terminals. If the phrenic end plates are involved there comes about failure of respiration which is the commonest immediate cause of death after snake-bites in Australia. Ptosis paralysis of the ciliary muscles and of the soft palate and paresis of the tongue are common in the later stages.

In addition to the neurotoxic action the venoms possess a haemolytic and cytolytic property leading to the formation of lysocithin like substances from the cell lipins and the liberation of histamine thence arise the symptoms of circulatory failure particularly seen after poisoning by the black snake (*Pseudechis porphyriacus*) and the copperhead tiger snake (*Notechis scutatus*). Some also have a coagulant action e.g. the *Demansia superba*. The brown snake (*Demansia textilis*) and the *Pseudechis porphyriacus* already mentioned. In the case of the second of these intravascular clotting may occur without direct entry of the venom into a vessel because of its rapid diffusibility. As with all snake poisons the symptoms vary in intensity according to amount injected and this depends on the clothing and whether the snake has got rid of some of its poison by biting shortly before.

The general symptoms usually begin in 15-60 minutes (they may be delayed till the venom enters the blood stream on release of the ligature) and consist of nausea vomiting faintness and drowsiness and perhaps pain in chest or abdomen. The skin becomes blanched and sweating pulse rapid and thready respirations quick and shallow. Neurotoxic symptoms are incoordinating drunken gait dilatation of pupils and failure to react to light or convergence ptosis lingual paresthesia with slurring speech and if the soft palate is involved a nasal intonation and dysphagia. Respirations become slow and costal and death may occur after convulsions. There is usually albuminuria with haematuria and perhaps haemoptysis and haematemesis. Such are the general symptoms those due to different snakes are the result of the preponderance of one active principle over the others. Thus —

Notechis scutatus (Tiger snake) venom: coagulant converting the prothrombin into thrombin cytolytic also but mainly neurotoxic and may be fatal in a few minutes if much venom is injected or a vessel pierced.

Acanthopsis antarcticus (Death adder) —Venom not coagulant feebly haemolytic strongly neurotoxic less strongly cytolytic so it produces petechial haemorrhages and death by respiratory failure.

Denansia textilis (Brown snake) —Venom powerfully neurotoxic acting partly peripherally (like curare) and strongly coagulant and diffusible causing death from thrombosis the site of the thrombus causes the variation in symptoms. A case is detailed in which a girl of 13 years died with symptoms of cardio-vascular failure 17 hours after being bitten on the foot. She had suffered from vomiting headache severe abdominal pain and giddiness and later ptosis and bulbar signs increasing rapidly of pulse and respiration haemoglobinuria restlessness coma and cyanosis. With this snake-bite there may be an interval of calm after 24 hours then a return with signs of paralysis of the diaphragm ending fatally 48 hours after the bite.

Denisonia superba (Copperhead) —A sluggish snake recorded bites of which are few. The venom is powerfully haemolytic and cytolytic not coagulant but strongly neurotoxic.

Pseudechis porphyriacus (Black snake) —Venom is more strongly haemolytic than that of any other common Australian snake also cytolytic and coagulant but feebly neurotoxic and rarely fatal unless the venom directly enters a vein.

Oxyuranus scutellatus (Taipan) is the most dangerous of Australian snakes it occurs in northern Queensland and in New Guinea. Fortunately it is one of the rarer species. It is a large snake and its venom is powerfully neurotoxic and coagulant and the fatality rate from its bite is high.

Of treatment with which the author deals little need be said here as it follows the usual lines of ligature washing excision and the administration of antivenene. What is called local venesection may be beneficial if applied early. A venous ligature is applied beyond the arterial ligature and then draining the region of the bite is cut so that when the arterial ligature is released blood enters the part but leaves the body from the cut vein taking venom with it instead of passing into the general circulation. [A most interesting and informative article and a real contribution to the clinical side of herpetology.]

H. Harold Scott

SARKAR (B B) MAITRA (S R) & GHOSH (B N) The Effect of Neurotoxin Haemolysin and Choline Esterase Isolated from Cobra Venom on Heart Blood Pressure and Respiration—*Indian J Med Res* 1942 July Vol 30 No 3 pp 453-466 With 6 figs [23 refs]

Venoms from different snakes have varying relative amounts of neurotoxic and haemolytic constituents. To determine what part of the toxic effects is due to each it is necessary to isolate these constituents and test them separately. Thus the authors have done in the case of the venom of the Indian cobra (*Naja naja*) storing the preparations in a dried state and in the cold and making up the solutions just before use since when dissolved they lose strength in a few hours. They investigated the actions of neurotoxin haemolysin and choline esterase and of crude venom on the heart the blood pressure and on respiration. The mld of neurotoxin used was 0.021 mgm and of the crude venom 0.1 mgm for the pigeon the haemolysin was 11 times more effective than the crude venom.

With crude venom the authors observed increased contraction of the frog's heart for a short time then diminution in height of contraction to below normal. With higher concentrations there was irregularity of action with ventricular block. The main differences when the isolated neurotoxin was used were that auriculo ventricular block was less evident and systolic constriction was absent.

Perfusion with haemolysin increased auricular and ventricular contractions followed later by diminution of contraction and irregularity of beat. Choline esterase (1/1000 or greater strength) caused slight increase of contraction but the force and rate of the heart beat continued to be regular.

As regards the effect on the mammalian heart—rabbit and guinea pig—weak dose of neurotoxin (1.5 mgm per kilo) had no effect larger dose (6.0 mgm per kilo) caused marked and prolonged stimulation of contraction but the beat remained regular and unaltered in rate. Haemolysin in small doses had a similar action but with doses of 8 mgm the beat became irregular then progressively slower and weaker till the heart stopped. A dose of 0.5 mgm of the crude venom per kilo brought about early cardiac arrest.

For estimating the effects on blood pressure and respiration the preparations were dissolved in 2 cc of warm Ringer solution and passed into the femoral or popliteal veins of rabbits anaesthetized by urethane. Crude venom in doses of 2 mgm per kilo caused a short rise followed by a marked fall in blood pressure and stoppage of the heart and respiration. Neurotoxin in doses ranging from 0.1 to 8.5 mgm did not appreciably affect the blood pressure but in so small a dose as 0.2 mgm per kilo it caused respiration gradually to diminish and finally to stop then as the consequence of the asphyxia the blood pressure rose rapidly. With 1.25 mgm doses of neurotoxin respiration ceased in seven minutes with 2.5 mgm in 4½ minutes and with 8.3 mgm in two minutes.

Haemolysin (0.2 to 6 mgm per kilo) produced a slight and gradual rise in blood pressure but had no effect on respiration. In doses of 10 mgm circulation and respiration ceased in about a minute. Artificial respiration effective in restoring the pressure to normal after neurotoxin was ineffectual with haemolysin.

Weak concentrations of crude venom therefore stimulate the heart and affect the force of contraction. Higher concentrations lead to depression and irregularity of action and to arrest in systole. The results of neurotoxin injection differ only in that it does not lead to arrest of the heart's action. Haemolysin in large doses causes arrest but the action here is complicated by the degree of haemolysis. Choline esterase in high concentration stimulates slightly the perfused frog's heart but in the case of the mammalian heart injection does not affect blood pressure nor has it any action on respiration.

H. Harold Scott

PIROSKY (Ig) SAMPAIO (R) & FRANCESCHI (C). Suero anti *Iatrodectus* I. Obtención y purificación [Preparation and Purification of *Iatrodectus* Antivenene].—*Rev. Inst. Bacteriol.* Dr. Carlos G. Malbrán, Buenos Aires 1942, Sept. Vol. 11, No. 1, pp. 83-93. With 1 fig. & 1 graph. [13 refs.]

For preparing an antivenene to the poison of *Iatrodectus mactans* (the Black Widow spider) the cephalothorax was separated and kept in a desiccator at 0-5°C. Under these conditions the toxicity remained unchanged for two years. For purposes of immunization horses were used. The cephalothoraces were triturated in a mortar and mixed with physiological saline with 0.1 per cent phenol, the final strength being one cephalothorax per cc. The first injection was 0.5 cc. Serum was obtained after 1,436 cc. had been injected in 14 weeks and again after the animal had had a three months rest when 870 cc. had been inoculated in seven weeks.

The serum was treated with 2 per cent sodium sulphate and a precipitate obtained in which were most of the active properties. The precipitated globulins were redissolved in one-third of the original volume of saline. One cc. of the first serum was found to protect 50 per cent of rats tested against 544 m.l.d. of the toxin and 1 cc. of the concentrated serum against 1,000 m.l.d. The protein contents of the two sera were 6.93 and 11.33 gm. per cent respectively.

Purification was performed by the method of peptic digestion and differential heat-coagulation (Pope's method). The product had a protein content of 7.2 per cent and after concentration 60.5 per cent. One cc. of this serum could protect 50 per cent of rats against 600 m.l.d. of the toxin and 1 cc. of the digested concentrate against 3,000 m.l.d. One gramme of the sulphate concentrated protein could protect against 10,884 m.l.d. and of the digestion concentrate against 49,584 m.l.d. An antiserum so strong as this latter should prove of value in the treatment of human beings bitten by the spider.

H. Harold Scott

MISCELLANEOUS

PESSOA (Samuel B). Ensaio sobre a distribuição geográfica de algumas endemias parasitárias no estado de São Paulo [Geographical Distribution of Certain Endemic Parasitic Diseases in São Paulo].—*Arquivos de Hygiene*, Rio de Janeiro 1941, Dec. Vol. 11, No. 2, pp. 7-25. With 9 maps. English summary.

The main interest of this article is in the series of instructive maps showing the incidence and relative intensity by graded shading of

ankylostomiasis leishmaniasis malaria and trypanosomiasis in the State of Sao Paulo. The prevalence of endemic disease generally is as would be expected greatest in those parts where rainfall and temperature are high. Hookworm infestation is only moderate [no actual figures of prevalence are given in this article merely general statements] in the higher plains but heavy near the shore and in both attacks mostly those in the second decade of life. Five maps deal with leishmaniasis: the first two show the districts where the endemicity is high one as it was found by Romeu DA SILVEIRA in 1914-19 the other as it was in 1941 according to the investigations of PRSSOA and PESTANA a third gives the percentage incidence in the several districts of high endemicity a fourth demonstrates by varied shading the incidence in different parts of the State the fifth is a map of the wooded areas showing how the zones of high endemicity and forestation on the left bank of the Tieté correspond. Alta Paulista and Alta Sorocabana to the north west where there are dense forests are the areas of highest endemicity.

The author next gives a map of the Parahyba Valley and the basin of the Pinheiro and Tieté near the capital town. This was formerly a place of anophelism without malaria because there anophelines were not anthropophilic but reservoirs have been made near the town by damming up the water and these are now breeding sites for *Anopheles darlingi*. Now only Alto de Serra and Campos de Jordao the highlands are free from malaria.

Chagas's disease depends not so much on climate and altitude as on housing conditions. As the woods are cleared and timber becomes scarce the people especially the poorer class have to live in mud huts which harbour the vector and the disease is becoming more common. A shaded map shows the areas where infected Triatomidae have been found where the insects are present but not infected and the parts where there are no Triatomidae.

H Harold Scott

MENDOZA (Lazaro) *Páginas clínicas* [Notes of Clinical Cases]—166 pp 1942 Biblioteca Universitaria Universidad de El Salvador Centro America

This publication contains a series of short papers on clinical cases seen in Salvador Central America. Among the subjects dealt with are malaria and typhus papers on the latter are abstracted separately in this *Bulletin*.

C W

RESSELER (R) *La calcémie chez les indigènes de l'Afrique centrale* (Note préliminaire) [Calcaemia in Central African Natives]—*Ann Soc Belge de Méd Trop* 1941 Mar 31 Vol 21 No 1 pp 1-7

DÍAZ RIVERA (R S) SUÁREZ (R M) & HERNÁNDEZ MORALES (F) *Hypoprothrombinemia Incident to Tropical and to Non Tropical Diseases*—*Bol Asoc Med de Puerto Rico* 1942 May Vol 34 No 5 pp 177-182

HSIUNG (J C) & KIM (H T) *Tumors in Infancy and Childhood a Statistical Study of 329 Cases in the Chinese*—*Chinese Med J* 1942 Jan-Feb Vol 61 No 1 pp 26-46 [42 refs]

DAVIDSON (J) *Flies Fleas and Lice*—*Med J Australia* 1942 Aug 15 29th Year Vol 2 No 7 pp 111-116 [25 refs]

HAKANSSON (E. G.) The Use of Aqueous Smears in the Examination of Feces for Intestinal Protozoa—*Amer J Trop Med* 1942 July Vol 22 No 4 pp 325-327

In a previous paper [this *Bulletin* 1936 Vol 33 p 534] the author described the changes which the free forms of intestinal protozoa undergo when the faecal preparation containing them is made with water instead of saline. These degenerative changes are characteristic of such protozoa so much so that they may be employed for identification purposes. In the present paper the author makes further observations on the use of the method. He notes that the presence of blastocysts frequently renders diagnosis of amoebic cysts difficult. The water method of examination however eliminates this as the blastocysts quickly disintegrate leaving the amoebic cysts more clearly visible [see this *Bulletin* 1940 Vol 37 p 218]. In the case of *Dientamoeba fragilis* undergoes a characteristic change. It swells for two or three minutes and then bursts the whole of the endoplasm being discharged through the rupture in the ectoplasm. When this has occurred the ectoplasm contracts and the rupture closes leaving the still spherical ectoplasmic shell within which one or two granules in active Brownian movement may be seen. With further experience the author is convinced of the value of his method which he presents as a routine laboratory procedure for the identification of the intestinal protozoa.

C. M. Henyon

GHOSH (Gaurechandra) Rural Sanitation—a Key to Success—*Indian Med Ga* 1942 July Vol 77 No 7 pp 427-431 With 3 figs

The author writes of the difficulty and yet of the importance of maintaining continuity in efforts to improve rural sanitation when these efforts depend upon voluntary cooperation of the villager. He emphasizes the importance of sanitary inspectors who are too often concerned only with vaccination and the collection of statistics but who might give a lead to the people in the inauguration of simple sanitary engineering schemes. He points out that these men should be capable of drilling, bored hole latrines or tube wells, should understand drainage and the use of mosquito larvicides, should know the probable vector of malaria in their districts and be able to identify them and should be able to carry out the small repairs to pumps without which so many good wells are rendered useless for long periods.

He gives samples of work which might be undertaken and add practical details which cannot be abstracted but with which every sanitary inspector should be familiar—protection of well, chlorination of water, village drainage, soakage pits and latrine, care of cow sheds and composting. [It is an excellent though brief article.]

C. H.

WAR OFFICE ARMY MEDICAL DEPARTMENT BULLETIN No 15
1942. Oct pp 3-5—Heat Stroke

It is noted that a healthy man with ample supplies of water and salt can withstand temperatures which may be dangerous to those in a state of relative dehydration and salt depletion due to gastrointestinal derangements or to those whose heat regulating mechanism

has been disturbed by such infections as malaria or sandfly fever or to men in a state of fatigue. The importance of ample water is stressed and the suggestion is made that at centres of traffic there should be water points at which troops may obtain cold drinks and sluices. But the state of dehydration due to sweating cannot be relieved by water alone salt must be given if necessary as a 0.1 per cent solution—a not unpleasant drink.

In very hot countries there should be heat stroke treatment centres in all camps barracks and hospitals. Heat stroke lorries have been useful in convoys.

A warning is given that constipation may be a result of dehydration rather than a predisposing cause of heat stroke and should not therefore heedlessly be treated by purges which cause further loss of salt and water from the bowel.

For the cooling of hospitals wet brushwood screens have proved even more useful than fans. All febrile patients must be closely watched since hyperpyrexia may develop suddenly. Recurrence of heat hyperpyrexia is not uncommon and three weeks of careful treatment are necessary before a patient should be allowed to travel or to resume activity. [The question of transfer to a cooler climate should be carefully considered.]

C II

BOOK REVIEWS

WEBSTER (Leslie T.) [M.D.] Rabies—pp vi+168 With 9 figs.
1942 New York The Macmillan Company [9s.]

As defined in the preface the author has attempted to fill the need for some treatise on rabies critical fairly inclusive but simple and available to all. He was no doubt considering chiefly an American public. As far as this country is concerned this little book should be a useful introduction to the medical or veterinary officer proceeding to a country where he may encounter the disease. It is a readable story and the essential facts about rabies are presented in a straightforward and simple fashion. The general impression conveyed by the treatment of the subject is of the New World with everything that is necessitarian everything that is mechanical striving to improve on the old tradition. In saying this it is not suggested that such an effort is not commendable. This is a far cry from the recommendation of Pliny the Elder for the treatment of the patient that he should eat the liver of the rabid dog which bit him. Advance is still possible and Pasteur was the pioneer who paved the way.

The author expounds at some length on vaccines and cauterization in the prevention of rabies following exposure to infection. He states that in the absence of treatment the chances of an exposed person's contracting rabies are unknown and that critical experimental evidence of the efficacy of vaccine treatment is lacking. A member of the general public reading the book might therefore think he could well revert to Les remèdes charitables de Madame Fouquet. Especially in these stringent times he might even consider it worth while to be bitten by a rabid dog if the remedies were a royal dish consisting of an omelette aux écaillés d'huitres pilées avec la poudre de pimprenelle to be washed down with a bottle of Chablis and a

journey to the plage of the Mediterranean or Dieppe to indulge in frequent bathing avant que le venin ait pénétré jusqu'aux parties nobles. However in this present book if he reads on he notes that against this however are McKendrick's statistics that if a person is bitten by a rabid dog and takes treatment his chances of contracting rabies are no more than 1 in 77 and usually as low as 1 in 510 and therefore persons exposed to rabies should be given vaccine treatment with confidence that then there is small likelihood of development of the disease. This should overcome any misgiving that may have arisen in his mind from the information given to him perhaps unwittingly on pages 95 and 96 that untoward effects of rabie treatment are too numerous to be ignored and that post vaccinal paralysis may appear which may be transient prolonged or fatal. The mind of the enquiring member of the general public is not likely to be cleared even when he is brought up with a jerk by the statement. Right here it should be made plain that McKendrick's carefully compiled and analysed statistics were designed to compare the effectiveness of anti rabies vaccines and not to answer the question whether vaccine does or does not protect against rabies. Indeed it is problematical whether mortality rates among treated persons can throw light on the effect of treatment.

Errors of any sort are few. Surely it is the printer and not the author who is responsible for the statement (page 17) that the virus remains active for at least 30 days in glycerine at 40 C [? 4 C] and the author would not suggest (page 95) that the low mortality may be due either to the treatment itself or to the resistance of the individual exposed.

Within the small compass of 167 pages there are chapters on (1) Rabies in animal and man (2) Is rabie a myth? (3) The cause of rabies (4) How the virus cause rabie. (5) How the virus damages the host (6) The diagnosis of rabies (7) History and epidemiology of rabies (8) Prevention of rabies prior to exposure (9) Evaluation of rabies vaccines and (10) Prevention of rabies following exposure.

The necessity of the control of the dog is emphasized by the inclusion of appendices on the licensing confinement and disposal of vicious and rabid dog. The more rare but not less important parts played by the mongoose in South Africa and the vampire bats in South America in transmitting rabies have not been forgotten. The comparatively recent realization of the usefulness of the white mouse for the diagnosis of rabies and the estimation of the potency of rabies vaccines has also been stressed. Cauterization with nitric acid of the wound caused by a bite is an established routine which according to this book appears to have survived in the new world.

It would appear that the author has tried to provide for too wide a public (v preface page vi — dog owner and general public but also veterinarian physician and student of virus diseases). The student of virus disease or laboratory worker would for example look in vain for a full and concise description of technical methods employed in the diagnosis of rabies. He would probably wish to know more of the properties of the virus but he might be consoled with appendix vi which deals with a subject of theoretical rather than practical interest. Rabies antibodies and their relation to immunity. If not he must use the book as a key to the scientific literature in the 62 references of the bibliography and to the text books referred to in a footnote on page 32.

The public health officer may feel that if the dog owner and general public read it he will not have to answer so many questions or cover the same ground so often. The physician however at least on this side of the Atlantic would no doubt look on so much popular science and outspoken frankness to the layman as inadvisable. During a course of vaccine injections following the bite of a rabid animal the favourable psychological state of the patient is an all important factor contributing to a successful issue. The physician would no doubt prefer that his patient knew less about prognosis and possible sequelae.

There is much in the book which is useful yet some of us may feel that a book about rabies which omits reference to Meister le petit berger Jupille and la vieille écurie de Villeneuve l'Étang while it may be practical and up to date lacks something which the modern bacteriological research worker at least should not be allowed to forget l'esprit Pastorien to which he owes so much. I A Gallouay

BELDING (David L.) [M.D. Professor of Bacteriology and Experimental Pathology Boston Univ. School of Med. etc.] *Textbook of Clinical Parasitology Including Laboratory Identification and Technique*—pp vi+888. With 279 fig. and 4 coloured plates. 1942. New York and London. D. Appleton Century Company. Inc. [45s.]

The author of this treatise has drawn freely but with method on the best available sources chiefly in the American and British literature. As he himself puts it. The writer has approached the subject not as a specialist but from the broad viewpoint of a biologist with a medical background who has followed for many years the teaching of parasitology to medical students.

His book gives a well arranged and straightforward account of medical parasitology in a very wide sense both the parasites and their vectors being dealt with in an adequate manner. The diagrams are numerous and clear the coloured plates and photographs excellent and the tables most helpful. To each section is appended a list of the more important references. The volume ends with a chapter on technical methods and treatment. Recent work is included for example RAO and MAPLESTONE'S description of the male and female adults of *Wuchereria malayi*.

Bearing in mind certain limitations which the author himself indicates it may be said that parasitologists will find here information on almost all matters with which they are likely to have to deal. Neither rat bite fever nor *Spirillum minus* appears in the index nor has the reviewer been able to trace them in the text. The same remarks apply to *Leptospira icterohaemorrhagiae* and spirochaetal jaundice. Although these cosmopolitan diseases of man are omitted there is more than a passing reference to certain diseases and parasites of animals e.g. Texas fever *Babesia bigemina* and *Spirochaeta gallinarum*. Yaws receives rather scant mention considering its great prevalence and the serious nature of its effects.

Blanfordia is retained e.g. *B. formosana* and *B. nosophora* as the name of snails concerned with the transmission of *Schistosoma japonicum*. *Borrelia* is adopted as the generic term instead of *Spirochaeta* for the relapsing fever parasites e.g. *B. recurrentis* and *B. duttoni*. *Treponema pertenue* is used for the parasite of yaws.

The ever-changing nomenclature of parasites and their transmitting agents will find any author at fault on some occasion. It may be said that in this volume these occasions are few in number for such a compendious work. *Man omnia a mutis*, is *Anopheles albopictus* and several other obvious slips of similar nature are to be found. The use of the specific name *Aroptodes costalis* may be regarded either as anachronistic or as an example of legitimate prophecy—one never knows what the creature's name may prove to be eventually. In any case the printer's modification of it—*Anopheles costalis* (p. 656)—is first class and can hardly fail in its no-talmic appeal to those who are familiar with West Africa.

This volume is certain to prove of great service to medical men engaged in work in the tropics and subtropics. Many laboratories will doubtless soon be set up in the East where the book will be found particularly useful because of the good account it gives of the parasites which may be found in China and other Far Eastern countries.

D. B. Blacklock

ALVARADO (Carlos Alberto). Tratamiento del paludismo [Treatment of Malaria]. 40 pp. With 4 folding coloured figs. [Bibliography.] 1941. Buenos Aires. Librería y Editorial El Ateneo. Florida 344-Cordoba 2099.

The author, who is the Director General of Malaria in the National Health Department of the Argentine, has written a condensed account of malaria and its treatment. With the aid of two excellent coloured plates the characteristics of the three forms of malaria parasite are described and the asexual and sexual cycles of development of the parasite are outlined. The main part of the small book is concerned with the therapeutics of malaria. Treatment both general and symptomatic is adequately dealt with. There are also chapters on collective treatment and drug prophylaxis of malaria. There is small room for originality in the preparation of a book of this kind but the author has selected his facts with care and his teaching is clear and concise.

Norman H. H.

BUREAU OF HYGIENE AND TROPICAL DISEASES

TROPICAL DISEASES BULLETIN

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[No 4

SUMMARY OF RECENT ABSTRACTS *

III MALARIA

[Continued from p 195]

Treatment

In a special article WHITE (p 801) has given a resumé of the opinions of a number of authorities on the treatment of malaria. At the present time the subject is dominated by the fact that most of the world supply of quinine has passed into enemy hands but there is general agreement that atabrin is an excellent substitute for quinine. CHRISTOPHERS argues against the intramuscular injection of quinine even in grave cases since it causes necrosis of muscle but this view is not supported by HUGHES or YORKE. Christopher prefers the intravenous route. Hughes after pointing out that malaria in the adult natives of endemic areas is usually best left alone emphasizes the necessity for prompt treatment of Europeans in those areas. He advocates the constant administration of 5 grains of quinine daily as a prophylactic a practice which has stood the test of time. Yorke is an advocate of short courses of quinine for the actual attacks followed by interrupted administration for several weeks to suppress relapses (see below). The longer courses sometimes advocated lead to great waste of quinine. HILL believes in high dosage of drugs for Europeans in endemic areas giving 0.3 gm atabrin and 30 grains quinine daily for seven days followed by quinine in smaller doses and plasmoquine. BRYANT (see below) also gives large doses of atabrin. HILL advises intravenous quinine or soluble atabrin in severe cases. For prophylaxis under the conditions of tropical Africa he claims that 5 grains of quinine daily is not enough he pushes atabrin to 0.1 gm daily without ill effect. DOVE alternates atabrin and quinine in treatment and follows this with a course of plasmoquine he does not inject quinine preferring atabrin intramuscularly for this method. He refers to the neurotoxic action of atabrin when given for long periods but the other workers concerned in this review make no

* The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin* 1942 Vol 39. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

mention of it. In summing up this evidence White concludes that there is ample justification for the prophylactic administration of atebryn up to a daily dose of 0.1 gm. to susceptible troops in areas where subtertian malaria is prevalent and that the toxicity of atebryn is not now stressed so much as before by those who have used it most [See also BI PHAM below.]

YORKE (p. 739) describes the standard treatment of malaria used at Liverpool. This consists of 30 grains of quinine daily for four days followed by 20 grains every Saturday and Sunday for eight weeks or 0.3 gm. atebryn daily for even days followed by 0.2 gm. each Saturday and Sunday for eight weeks. Intramuscular injections of quinine are given in severe cases. He points out that atebryn should be used whenever possible in order to conserve quinine. DAVENNEY (p. 256) is a strong advocate of the value of intramuscular injections of quinine given 1-1 hour before the temperature begins to rise. Five grains given in this way are stated to be enough to cure the acute symptoms and this procedure effects great saving in quinine.

In the treatment of cerebral malaria WRIGHT (p. 432) relies on intramuscular or oral quinine since intravenous administration has given but indifferent results in his hands (but he used the intravenous route in a few desperate cases only).

NICOL and SHUTE (p. 739) state that 5 grains of quinine daily for 15 days will cure an attack of *P. vivax* malaria and that higher dosage or extended treatment will not prevent relapse. *P. falciparum* requires 10 grains daily for 10 days.

SANDERS (p. 813) writes in favour of a short course of quinidine in the treatment of malaria but notes that there is a similarity between all anti-malarial drugs in that they cure 60-75 per cent. of cases.

BRYANT (p. 666) is an advocate of heavy dosage with atebryn in the treatment of *P. falciparum* infections. In the Sudan he has given 0.6 or even 0.9 gm. daily and has seen no ill effects if plenty of hot, very sweet tea (or sugar in some other form) is given. Thus during the first two days 1.2 or 1.8 gm. may be given (some of this injected in the form of atebryn musonate if necessary) thereafter 0.3 gm. daily until a total of 2.0 to 2.4 gm. has been taken. After an interval of four days this is followed by quinine 15 grains daily for four days and after a further interval of four days by plasmoquine simplex 0.06 gm. daily for 3-4 days if tolerated.

MEYTHALEP (p. 806) is an advocate of short courses and moderate doses of atebryn except in severe cases in which he is prepared to give 0.6 gm. daily until the temperature is normal or to inject atebryn musonate intramuscularly. He draws attention to the value of lumbar puncture in cerebral malaria and of blood transfusions [see also WILE and MUNDY below]. He also uses quinine-urethane intravenously in severe attacks. In comment MEGAW suggests that a few doses of quinine might be given initially in all cases of subtertian infection before the course of atebryn is commenced.

SCHUFFNER (p. 431) states that in benign tertian infections relapses occur in at least half the cases irrespective of the kind or duration of treatment. He therefore advises a short course of treatment with quinine or atebryn followed by treatment of relapses as they occur.

NAPIER and CHAUDHURI (p. 171) give details of a course of treatment administered to a patient with benign tertian malaria which relapsed persistently in spite of quinine, atebryn and plasmoquine. Details may be found in the original abstract.

CONDORELLI (p 257) reports a case of malaria in which an injection of quinine gave rise to a severe state of purpura haemorrhagica. The patient had shown no sign of intolerance to quinine taken as a prophylactic and the author therefore concludes that it was the association of malaria and quinine which precipitated the condition. SIEGENBEER, VAN HEUKELOM and WARAB (p 257) describe a similar case except that malaria was apparently not a factor. Records of platelet counts are given for this case. FISCHER and STAUPENDAHLE (p 434) report two cases in which mild urticaria due to quinine was followed by severe urticarial dermatitis with marked constitutional disturbance after atabrin had been substituted for the quinine. They suggest that in persons sensitive to quinine a preliminary test dose of atabrin should be given before starting on full doses and that those found to be hypersensitive to these drugs should not go to malarious countries.

An extensive enquiry has led BISPHAM (p 178) to the conclusion that the toxic effects of atabrin are of small importance. Slowness of elimination is an important factor in producing such symptoms as do occur and the author advises that the bowels should be kept freely open and that fluids should be taken copiously during administration.

DALÉAS (p 179) writes in favour of the compound Quinoblen, a combination of quinine, suprarenal extract and methylene blue in the treatment of severe malaria.

LIT *et al* (p 179) describe the alkaloid sinine derived from the root bark of *Fraxinus malacophylla*, a tree common in the Yunnan Province of China. It differs in many respects from quinine but apparently is an effective treatment for malaria of all kinds. Stem bark and leaves are also useful.

JACOVIACCI (p 433) writes in favour of Italchina, an Italian acridine derivative in the treatment of *P. vivax* infections.

FIELD *et al* (p 179) have attempted an evaluation of the claims made for the Italian drug M3 in the prevention of malaria. In a controlled experiment in Malaya no prophylactic effect was found.

COGGESHALL *et al* (p 395) have tested promin and sulphadiazine against the various forms of malaria of monkeys and man. Some action was observed but the general conclusion is that although these drugs may be looked upon as important substitutes for quinine and atabrin there are no reasons for giving them in preference to the older drugs. SCHWARTZ *et al* (p 601) have used sulphathiazole in treatment of induced *P. vivax* malaria. The results were not very encouraging in the few cases treated.

WINCKEL (p 121) shows that neoarsphenamine can be used successfully to suppress though not to eradicate attacks of *P. vivax* malaria when this infection is used therapeutically. It has no effect on *P. malariae* infections. Different strains of *P. vivax* vary in their susceptibility to the drug. NIVEN (p 258) has made an estimate of the value of mapharside in the treatment of malaria. It is useful in acute *P. vivax* infections but its effect in chronic infections was not investigated. Against all forms of *P. falciparum* and *P. malariae* it is useless.

For the dangerous symptoms which may arise during the course of induced malaria WILE and MUNDT (p 433) note that blood transfusion is most efficacious in cases of peripheral circulatory collapse, severe anaemia or persistent hypotension. Thio bismol given just before an expected chill may secure a temporary remission.

VELICK (p 742) shows that anti malarial drugs can be tested in the Warburg manometer by the effect they have on the oxygen consumption of the parasites

FIGUEROA (p 433) has given an analysis of two species of Colombian Cinchona

Drug Prophylaxis

For prophylaxis of malaria ROSE (p 396) advocates the daily administration of 0.06 gm atabrin rather than of higher doses at longer intervals. In the Balkans the Germans have used specially prepared tablets of 0.06 gm in this manner. Rose is at pains to point out that atabrin does not cause diarrhoea.

FIELD *et al* (p 182) have made observations on the prophylactic effect of plasmoquine 0.02 gm given twice each week for a year in an area of uncontrolled mosquito breeding in Malaya. Most of the malaria was due to *P. vivax* but *P. falciparum* was fairly common. The transmission of the latter was very low during the period of administration of plasmoquine and most of the attacks were probably recurrences of old infections. Nevertheless the authors conclude that in an area in which fresh transmission of *P. falciparum* is slight and infections are mostly residual or are contracted elsewhere the prophylactic administration of plasmoquine in this dosage may not markedly affect either the general course or the incidence and severity of clinical attacks [See also *Treatment* above]

Control

General—In a review of malaria control issued by the Government of Palestine (p 592) it is noted that for many years the measures taken have been directed against mosquito breeding. In towns wells and cisterns have been mosquito-proofed and other collections of water have been regularly oiled. In the rural areas attention has been paid to prevention of stagnation of water in summer drainage and irrigation and pumping operations. The clearing of small water-courses and the application of oil or Paris green. Particular mention is made of the alternation of irrigation channels a system which has been followed for generations near Nablus which has always been free from malaria though the disease is common in the surrounding villages. In all important drainage schemes channelling by dynamite is the method of choice but the soil must be wet.

In this work in Palestine the two underlying principles of self help and the welfare of rural agriculture have been stressed and the benefit of the various schemes not only to health but also to cultivation—for instance the reclaiming of valuable marsh land—has produced in the people a spirit of prompt and energetic co operation. The success of this long campaign is shown in figures of spleen rates which in many areas have fallen notably since 1919. But large zones still remain to be dealt with where the disease is prevalent for instance the Jordan valley and certain swamps. The populations there are sparse. It is noted that anti malaria measures are in the hands of the Department of Health there is no special anti malaria service.

DRENSKY (p 602) points out that in the Struma region of Bulgaria the mortality from malaria may at times be greater than that of all other diseases together. An anti malaria station was founded at Petritsch by the Rockefeller Foundation and during 10 years comparisons of the different methods of malaria control have been made.

The general conclusion is that systematic anti larval measures such as drainage and the use of Paris green are very effective and cheap and are much superior to attempts to control the disease by quinine administration alone

BUONOVINI (p 18) has studied the Anopheles of a region in the Naples area in which bonification is in progress Five varieties of *Anopheles maculipennis* are found of which two (*labranchiae* and *clutus*) are the important vectors The prevalence of these was found to diminish as the process of bonification proceeded

ROSS and AYLEN (p 260) make the point that in S Rhodesia a very large proportion of the breeding places of *A gambiae* and *A funestus* are provided directly or indirectly by soil erosion In such places the best methods of controlling malaria are those designed to prevent erosion They give an account of methods of permanent control which can be adopted under these circumstances

KINGSBURY (p 258) refers once more to the effect of the replantation of rubber trees on the incidence of malaria in Malaya the disturbance of the soil thus occasioned affords ideal conditions for the breeding of *A maculatus* He mentions measures proposed to control this breeding

VISWANATHAN (p 435) shows in a table some of the results achieved by the Assam Medical Research Society in the control of malaria over a period of 10 years The control of *A minimus* the principal vector has been carried out by means of oil and Paris green sluicing and shading and by spraying with Pyrocyde 20 in an attack on the adults

COVELL (p 259) reports on the permanent anti malaria measures which have been taken at Delhi

DE NEGRI (p 262) discusses the effect of diet on malaria in an agricultural community in the delta of the river Po Malaria is rife and the diet is insufficient in quantity and unsuitable in quality in particular there is a shortage of milk for the children Feeding centres have therefore been established where the children can spend the day and infected children receive appropriate treatment a noteworthy change for the better has taken place in the general health of the children as a result of these measures In comment WHITE remarks that this aspect of malaria control has not received the attention it deserves [It is an aspect which will need to be stressed when the relief of the people of enemy occupied malarious countries is undertaken]

Mosquito-proofing—In the Tennessee Valley WATSON and MAHER (p 261) have found that in houses screened against malaria the primary attack rate per 1 000 days of exposure (calculated from 15th May) was 1.64 against 3.1 in unscreened houses The parasite indices of persons living in unscreened houses rose during the transmission season those of persons in screened houses remained constant It appears therefore that mosquito proofing gave very considerable protection against malaria infection In the same area HEWITT and KOTCHER (p 261) found fewer *A quadrimaculatus* in the screened than in the unscreened houses but noted that screening did not appear to reduce the number of mosquitoes able to leave the houses after having been stained and released indoors WATSON and RICE (p 436) have made further detailed observations on the value of mosquito-proofing in the Tennessee Valley the amount of protection afforded is very considerable

FRICKS (p 521) in a paper published originally in 1920 and re-published in 1941 emphasizes the importance of hand destruction of engorged mosquitoes in the prevention of malaria. They are easily destroyed and can be found most readily in rooms with light-coloured walls and in screened rooms on the wire of doors or windows.

Insecticidal sprays—VISWANATHAN (p 180) has carried out an experiment on the spraying of houses with a mixture of Pyroclide 20 (1 part) and kerosene (19 parts) in Assam where *A. minimus* is the vector and where malaria is endemic. The houses which were not completely closed during the process were sprayed once each week for 9 months rather less than half the available houses were sprayed the unsprayed houses acting as controls. The malaria morbidity of the whole area fell below what would have been expected but no difference could be found between the morbidity in the inhabitants of the sprayed and the unsprayed houses except in infants whose malaria index fell in the sprayed houses while it rose greatly in the unsprayed. Spleen rates were the same in the two groups but there was a decline in parasite rate in the sprayed houses which was not found in the unsprayed. Infestation of anophelines did not differ greatly but fewer infected specimens were found in the sprayed houses.

RUSSELL and KNIFE (p 667) report on the results achieved in the third season of their method of malaria control by spray killing adult mosquitoes. The ordinary slit gun sprayer is wasteful and inefficient and a small petrol engine compressor has been used for the air tanks the best method for generating gas pressure is by the use of solid carbon dioxide but this is too expensive for general use. [An apparatus for the use of carbon dioxide is described by KNIFE (p 181).] In the meantime efforts to devise a suitable apparatus are continuing. The general results of spray killing on the incidence of malaria are good a local extract of Pyrethrum is much cheaper than Pyroclide 20 and is equally effective. Spleen rates have shown a notable fall and parasites a downward trend in the sprayed villages but have risen slightly in control villages. Cost has been reduced and the villagers like the method. local free labour would still further reduce cost.

RUSSELL and MENON (p 808) have endeavoured to ascertain the economic burden of malaria on the inhabitants of a rural area of Madras. They conclude that the direct financial loss due to malaria is considerably greater than the amount it would cost to control the disease by spray killing adult mosquitoes but they also suggest that as most of the breeding is due to irrigation a portion of the irrigation tax should be set aside for control measures.

Water control—LEE (p 397) describes the importance of the study of the water table by means of experimental tube wells before embarking on drainage or filling schemes and during the operation of these schemes.

TWEEDIE *et al* (p 522) give details of the construction of fascine drains which have given satisfactory results in the water-courses which provide the principal breeding places of *A. maculatus*. The method cannot further be abstracted but is set out in some detail with illustrations in the original summary.

EJERCITO and CELIS (p 262) describe an automatic siphon for the control of streams of considerable size.

RENSODIWIJO (p 437) describes the construction of two automatic drainage valves to shut off surface drains from tidal water.

RAO (p 299) reports that the treatment of rice fields in the coastal plain of Orissa by soaking them with sullage once each week during the dry season results in great reduction of breeding of *A annularis* the common malaria vector during the rains. The sullage was allowed to run over the field to a depth of about $\frac{1}{2}$ inch and the field usually dried in 24-36 hours. It was ploughed once each month until the rains after that irrigation was by rain only. A list is given of the mosquitoes found in the sullage-treated and control fields. The reduction of *A annularis* is very evident and the author suggests that this method may have a wide application.

PER FOUNT (p 740) discusses the effect of flooding on trees and other plants with relation to impounded waters and the possible production of mosquito breeding places.

ROY and ROY (p 437) have noticed that the aquatic plant *Pistia stratiotes* is invariably present in tanks and other breeding places of Anopheles in the Murshidabad area. Removal of *P stratiotes* from all water tanks in one village resulted in great decrease in the incidence of malaria. In another village removal of other aquatic plants leaving *P stratiotes* intact resulted in an increase of malaria. The vector was not identified but *A philippinensis* was suspected.

Larvicides etc—McMAHON (p 396) notes that used motor engine oils have no toxic properties on mosquito larvae and kill only by cutting off air supply. Except in very heavy dosage the oils cannot be relied upon. The addition of kerosene in relatively large quantity is necessary to produce good results and is therefore uneconomical.

MISRA (p 437) describes two methods of oiling streams by means of automatic drip systems.

JORDAN and SILVEY (p 122) consider that a Pyrethrum containing larvicide is best suited to local conditions in Shanghai and advocate an emulsion in soap and water of a light oil containing Pyrethrum extract. Paradichlorobenzene is a stable addition and permits reduction in the quantity of Pyrethrum and tetrahydronaphthalene has a similar effect. These compounds are cheaper than the Pyrethrum extract. JETTAM (p 122) states that powdered Pyrethrum scattered over water in the proportion of 50-100 gm per 1 000 litres kills culicine and anopheline larvae and advocates this method for tanks or small collections of stagnant water.

LYOVSKY (p 603) has found chlorophenol an effective larvicide especially when mixed with petroleum. It is cheap and easy to store.

KENNEDY (p 181) shows that copper sulphate in a dilution as low as 1 part (anhydrous) in 100 000 is lethal to larvae of *A maculipennis atroparvus*.

JOB (p 668) has conducted an experiment by dividing a borrow pit into three parts by means of bunds. One section was treated regularly with Paris green. The second was stocked with the fish *Aplocheilichthys panchax*. The third was held as control. The fish were more effective than Paris green in destroying the aquatic forms of anophelines and culicines and at a much smaller cost.

SCHARFF and TWEEDIE (p 814) note that at Singapore the mud lobster *Thalassina anomala* has a bearing on malaria in that it damages tidal bunds by burrowing and that the crab holes it makes may provide breeding places for mosquitoes. By pouring into the holes a mixture of lime and water (5 lb to 3 gallons) and ramming sand on top the lobsters can be destroyed and by incorporating fibrous material from

coconut palms soaked in coal tar in the bunds burrowing will be prevented.

Malaria of Monkeys and Birds

Monkeys—MAIER and COGGESHALL (p 397) show that blood infected with *P. knowlesi* and other malaria parasites takes up far more oxygen than normal blood while the parasites survive and that glucose is used up. If the glucose is not renewed the oxygen uptake declines but certain other sugars can be used in place of glucose. These authors (p 397) failed to correlate the therapeutic effects of nine drugs with their action in interfering with parasite respiration and conclude therefore that the effect of a drug on parasite respiration cannot be relied upon to furnish an index of therapeutic efficiency.

DEVINE and FULTON (p 438) have examined the pigment produced by *P. knowlesi*; it is indistinguishable from haematin. MORRISON and ANDERSON (p 741) agree with SINTON and GHOSH that the pigment of *P. knowlesi* is baematin (ferrihaemic acid). These authors (pp 604-741) have shown that disodium ferrihaemate (alkaline baematin) causes an acute toxic reaction when injected into monkeys but they conclude that the symptoms of the malarial paroxysm cannot be due to this substance since the pigment is not liberated in a soluble form from the malarial parasites. ANDERSON *et al* (p 811) have injected disodium ferrihaemate intravenously into dogs; it produces marked vascular reactions and renal lesions. Many of the changes are similar to those which occur in malaria and blackwater fever.

RAI *et al* (p 741) have carried out an agglutination test on monkeys recovered from *P. knowlesi* infection with an antigen of infected red cells containing a high proportion of mature parasites. Agglutinins appear after the acute phase of infection has passed and increase during the course of chronic infection; they may be present in monkeys immunized by injection of killed parasites.

FULTON and LORKE (p 438) show that a strain of *P. knowlesi* in monkeys which at first was held in check by relatively small doses of plasmoquine became after repeated exposure to the drug so resistant that it was not influenced by four times the original dose. This resistance was maintained after passage to other monkeys [Compare FULTON below].

DIXSHIT (p 524) has shown that the replacement of 80 per cent of the blood of a monkey immune to *P. knowlesi* by non immune monkey blood produces no loss of immunity and that the replacement of 70 per cent of blood of a normal monkey by immune monkey blood results in the acquisition of immunity. The cellular and humoral elements therefore work in close co-operation, the latter acting probably by stimulation of the cells rather than directly on the parasites.

COGGESHALL (p 400) shows that *A. qu. d. imaculatus* is readily infected by *P. cynomolgi* and transmits the infection to normal rhesus monkeys. This mosquito can also be infected by *P. lophiae*.

Birds—The injection of colloidal palladium intravenously into chickens produces blockage of the reticulo-endothelial system with subsequent hypertrophy of the cells of that system but these changes are limited to the cells within the vascular system. SCHULEMANN and KNOCH (p 25) have shown that such injections made at different stages of infection with *P. gallinaceum* delay the appearance or reduce the number of erythrocytic schizonts but greatly increase the number of exoerythrocytic schizonts in every organ to such an extent that the

vessels of the brain may be filled. The explanation offered is that after palladium injections the hypertrophy of the reticulo-endothelial system is accompanied by great increase in phagocytic power. Large numbers of infected red cells are phagocytosed but many of the contained parasites survive to develop into exoerythrocytic schizonts. The increased phagocytosis means that fewer infected red cells remain in the circulation and blood infection therefore is not so intense as in birds not injected with palladium. This work of course postulates that exoerythrocytic forms may arise from erythrocytic forms and this contention is supported by the work of ZAIN (p 26) who found that both forms could be found in fowls inoculated with blood taken from other fowls at the height of infection. Moreover the supernatant fluid from citrated blood taken during infection is infective and leads to the formation of exoerythrocytic schizonts but if the fluid is passed through a filter with pore measurements of 2.27μ or less infection is prevented. Examination of material held back by the filter showed among other forms a number of mature pigmented schizonts larger than merozoites and it is concluded that these schizonts which are not removed from the supernatant fluid by centrifugation are the infective agents. It seems therefore that exoerythrocytic schizonts may arise from the erythrocytic forms but in this case they appear at a later stage than when derived from an infection with exoerythrocytic schizonts.

ZAIN (p 669) points out that the injection of blood containing erythrocytic forms of *P. gallinaceum* into fowls causes a late appearance of exoerythrocytic schizonts in the brain. The inoculation of sporozoites leads to their early appearance. If the exoerythrocytic forms developed from erythrocytic forms are injected they lead to early appearance of exoerythrocytic forms as after sporozoite inoculation.

CORRADETTI (p 668) considers that when sporozoites or exoerythrocytic forms of *P. gallinaceum* are injected into fowls invasion of the reticulo endothelial cells occurs with the development of exoerythrocytic schizonts because there is as yet no immunity. As immunity develops the exoerythrocytic cycle ceases. He does not consider that resistance to drugs and relapses are due to exoerythrocytic forms since these forms may not be present in birds showing these features. Relapses are due to persistent erythrocytic forms which have taken on renewed activity.

SEETHARAMA IYER *et al* (p 524) have found exoerythrocytic schizonts of *P. gallinaceum* in fowls infected by sporozoites as early as the fifth day. They conclude that these forms develop from sporozoites and may later give rise to the pigmented erythrocytic forms.

MISSIROLI (p 123) maintains that sporozoites of bird malaria parasites do not undergo development within endothelial cells but that they develop extracellularly in the lymphatics draining the point of injection and that the merozoites so formed enter red cells or tissue cells according to the species of parasite concerned. WENYON criticizes this work in that deductions are made from the fact that parasites are seen outside the cells in smears from spleen or liver these may not be truly extracellular but may have been extruded from the cells in the process of smear making and the limits of cell cytoplasm are not clear in such smears.

KIKUTH and MUDROW (p 399) discuss the development of sporozoites after injection into birds. In their view the sporozoites after an initial delay become uninucleate rounded bodies within cells of the

reticulo endothelial system at the site of inoculation or in the internal organs. Merozoites are then formed and may enter other reticulo-endothelial cells or red blood cells.

RUSSELL *et al* (p 300) report the finding that sporozoites of *P. gallinaceum* dissected from the salivary glands of mosquitoes and subjected to ultra violet radiation when injected into fowls will not cause infection but will stimulate the production of agglutinins to higher titres than are commonly found after natural infection. In a second paper the same authors (p 300) show that subsequent infection of fowls inoculated in this manner takes place readily but that the severity of the attacks varies inversely as the titre of agglutinins. Low titre attacks of normal severity. High titre attacks mild and mortality rate low or absent.

BELTRAN and IARENAS (p 399) confirm the work of SHORTT and MENON that chickens may be infected with *P. gallinaceum* by the introduction of infected blood into the mouth. YOUNG (p 400) has infected pigeons with *P. relictum* by the same route and looks upon this as affording further evidence that the parasites may be able to live in types of tissue other than blood. BELTRAN and VARGAS (p 670) however have failed to infect chickens with sporozoites of *P. gallinaceum* by the oral route.

ADLER and TCHERNOMORETZ (p 524) have shown that in fowls infected with *P. gallinaceum* quinine will eliminate erythrocytic schizonts but leaves the exoerythrocytic forms intact. The exoerythrocytic schizonts may be passed by inoculation of brain emulsions and provided that quinine administration is maintained the pigmented erythrocytic forms do not appear but are soon found if quinine is stopped.

HEGNER *et al* (pp 174-398) have found the quinine derivative hydroxyethylapocupreime to be as effective as and less toxic than quinine in certain forms of bird malaria. It is probable that this derivative will prove effective in human malaria.

AFRICA *et al* (p 27) find that prontosil has a decided action in clearing the blood of birds infected with *P. relictum* but that it does not prevent relapses even though continued long after the blood is clear. This result is contrasted with the failure of COGHESALL to influence with sulphanilamide *P. lophurae* and *P. cathemerium* in birds and *P. malariae* in man but is compared with his success with *P. knowlesi* in monkeys.

FULTON (p 815) has failed to render a strain of *P. gallinaceum* resistant to plasmoquine. This failure may be correlated with the presence of exoerythrocytic schizonts which are known to be unaffected by the drug and which were found to be equally prevalent in treated and untreated birds. [Compare FULTON and LORKE above.]

VIZZOSO (p 605) states that although serum from birds which have recovered from *P. gallinaceum* infection will not confer passive immunity if taken from birds some months after recovery it will produce some degree of immunity if taken from birds within 10 to 50 days of recovery.

BOYD and DUNN (p 439) have previously shown that quinine and plasmoquine act in *P. cathemerium* infections by inhibiting reproduction of the parasites and by causing reduction in the size of the schizonts so that few merozoites are produced. They now bring evidence to prove that the action of atabrin is of the same kind. BECKMAN (p 439) obtained similar results in that he noted after treatment with atabrin

that the proportion of small parasites in the blood was greatly increased. This he attributes to retardation of growth.

SCHULEMANN (p 743) has followed the development of inoculated sporozoites of *P. cathemerium*. They divide in the tissues but extracellularly into two uninucleate rounded bodies but certain other forms are seen which apparently develop irregularly.

BROOKE (p 742) failed to induce infection in birds inoculated with sporozoites from oöcysts of *P. cathemerium* and *P. relictum*. He deduces that the sporozoites are probably not infective until they have escaped from the oöcyst.

COULSTON and MANWELL (p 410) have induced infections from a single parasite of *P. circumflexum*. These infections are slight but from birds so infected severe attacks may be induced in others by subinoculation. Erythrocytic schizonts are not found in the slight infections but are regularly found in the severe cases. It seems certain therefore that these forms can originate from the pigmented stages in red blood cells and that they develop when the defence mechanism is at some disadvantage. [See CORRADETTI above.]

TRAGER (p 440) has examined the viability of *P. lophurae* in a fluid medium maintained at 39.5–42°C. Survival was increased by aeration and by optimal additions of serum, glucose or other substances and infectivity was maintained up to the sixth day. There was evidence that the parasites multiplied on the first day.

He (p 441) quotes evidence which indicates that blockage of the lymphoid macrophage system by intraperitoneal injections of carbon ink interferes with the development of acquired immunity of chicks against *P. lophurae* but notes that when the ink is injected into the heart there is no such interference although the blockage of the lymphoid macrophage system is more complete.

WALKER and VA DYKE (p 441) have found that sulphathiazole, sulphadiazine and to a smaller extent sulphadiazine are effective against *P. lophurae* infections of ducks.

Charles Wilcocks

MALARIA

SIMMONS (James Stevens). Progress in the Army's Fight against Malaria.—*Jl Amer Med Assoc* 1942 Sept 5 Vol 120 No 1 pp 30–34. With 5 figs.

This lecture gives an interesting historical account of the importance of malaria as a cause of morbidity and death in the armed forces of the United States from early times up to the present. From 1819 to 1880 the period of clinical recognition of the disease the hospital admission rates for malaria of white troops per 1 000 in the United States ranged from 200 to about 1 000 a year. The disease occurred in all sections of the States but was most prevalent in the South. During the subsequent 20 years the period of etiologic knowledge there was a marked decline in malaria incidence from about 200 to 100 and the malaria mortality rate fell from 0.56 per 1 000 in 1880 to 0.2 in 1898. The improvement was largely due to civic improvement in communities near Army garrisons. In many posts the rates remained very high a large proportion of the troops being infected each year. There was a marked increase of malaria incidence as a result of the Spanish

American War There has been great progress in the control of malaria in the American Army since the beginning of the century that is since the discovery of mosquito transmission. The hospital admission rates for malaria for all white troops in the Army regardless of location were 392 254 and 183 per 1 000 in 1901 1902 and 1903. Since the last war the highest rate has been 10 9 in 1901 the lowest 3 8 in 1938 and 1939. An interesting graph illustrates the fall in the malaria admission rates of troops stationed in Panama the Philippines and the United States respectively during the present century a graph which redounds to the credit of the Army Medical Service.

The measures taken to combat the threat of malaria at the present time have been far reaching. They include the establishment of a Preventive Medicine Service in the Surgeon General's Office a section of which Service directed by an eminent malarialogist is devoted entirely to the control of malaria and other tropical diseases. There is also a Commission on Tropical Diseases composed of experts. The Division of Medical Sciences National Research Council has formed a Sub-committee on Tropical Diseases which has advised the Army on matters of policy and has helped in the planning of training programmes and research projects. The Rockefeller Foundation the American Red Cross and the Federal and State Health Services have all helped. The intensification of anti mosquito campaigns in permanent camps kept the annual admission rate for malaria down to 1 7 per 1 000 in 1941 in spite of an enormous increase in the size of the Army. A special health service helped in the selection and sanitation of the Caribbean bases acquired from Great Britain and did very valuable work.

American armed forces are operating in many parts of the world in which malaria is not the least dreaded enemy that they face. This lecture shows that they will be extremely well equipped for that fight.

Norman White

S. C. LIT & MESSERLIN. Extra t du Rapport Annuel sur l'activite du Service Antipaludique en 1939 [Annual Report of the Malaria Service of Morocco for 1939]—Bull Int Hyg Ma c 1939 July-Dec No 3-4 PP 277-41

KIKUTH (Walter) Experimentelle Ergebnisse zur Klinik und Therapie der Malaria [Experimental Investigation on the Clinical Course and Therapy of Malaria.]—Deut Med Woch 1942. Oct 16 Vol 68 No 42 PP 1074-1077 With 1 fi

The paper begins with a brief review of the wide geographical distribution of malaria and of its influence during war. Kikuth then points out that when the life-cycle of the malaria parasite had been worked out no less a person than KOCH hoped that by thorough treatment with quinine it would prove possible to make whole communities parasite-free and thus by preventing the infection of the mosquito to combat the disease. Unfortunately however this hypothesis turned out to be fallacious. Quinine controlled the acute attack thereby reducing the mortality of the disease but the morbidity remained unchanged and relapses especially in simple tertian malaria were not prevented. Furthermore it was soon discovered that quinine had no effect on the gametocytes of malignant tertian malaria and accordingly infection of mosquitoes was not prevented by the drug in this disease.

The explanation of the occurrence of relapses remained unsolved as the theory that the gametocytes changed into asexual forms could not be accepted. The so-called spring relapses in Holland, Macedonia and Russia remained a special enigma. These relapses occurred at the same time as new cases at the beginning of spring before the adult mosquitoes had begun to swarm; they could not be due to mosquitoes which had hibernated and these do not remain infective throughout the winter, the sporozoites degenerating after some weeks or months.

KORTEWEG was the first to draw attention to the long latency of the first infection and the spring relapse and to trace it back to an infection occurring in the preceding late summer. Further experimental work showed that the season of the year had nothing to do with the matter but that the late relapses and the cases with long latency developed on an average in about nine months after infection.

This was broadly the position of knowledge at the end of the last world war. Experience has shown that quinine is no true causal prophylactic but that it controls the infection. After the termination of the war two great German discoveries were made: *viz.* the malaria therapy of general paralytics by WAGNER JAUREGG and the production of the synthetic antimalarials plasmoquine and atebryn. The former discovery afforded great opportunities for studying malaria. Wagner Jauregg's method consisted in infecting the paralytics with blood containing the asexual forms of the parasite. Two facts stood out in this work: *vi.* the severity of the artificially induced disease and the ease with which it could be permanently cured with small doses of quinine. The difference in the course of the induced and natural infections was further demonstrated in a convincing manner when British investigators introduced the method of infecting the paralytics by means of sporozoites. YORKE and MACFIE (1924-25) made a very interesting observation which was of considerable significance for further investigation of the developmental cycle of the malaria parasite. They showed that quinine given during the incubation period was inactive in sporozoite infections whereas in blood infections it prevented the development of the disease.

Then came the discovery of the two new synthetic antimalarial substances plasmoquine and atebryn. Atebryn acts on the asexual forms of all the malaria parasites but as a causal prophylactic it is just as inactive as quinine. Plasmoquine proved to be an antimalarial substance of quite a new kind in that it destroyed the crescents in malignant tertian malaria. It also exhibited another property in that it lessened the relapse rate in simple tertian malaria. JAMES and his colleagues showed that plasmoquine in daily doses of 0.06 gm. on six successive days inhibited the development of the infection in mosquito-induced simple tertian and malignant tertian malaria. This observation was peculiar in that plasmoquine has no action on the schizonts of malignant tertian malaria. Unfortunately however these large doses of plasmoquine were not entirely harmless and consequently at the present time notwithstanding its definite prophylactic action causal prophylaxis is still impossible.

It was whilst he was concerned with this problem that James advanced the hypothesis that the sporozoites in certain circumstances underwent a development in the cells of the connective tissue or endothelium before they reached the circulation and entered the red blood cells. This hypothesis was also reached about the same time by

also dates on which eggs and larval instars were observed and on which the first adults of the next generation emerged from the water. He also gives information about the dates at which aquatic stages ceased to be observed in the autumn. As his primary object is to define the period over which control of the breeding places should be exercised he bases his figures on observations made in the warmest of three consecutive years.

The details which are set out fully are mainly of local interest. It seems that in different parts of the area females begin to emerge from hibernation from the end of February to the middle of April and it is recommended that control of waters should start between early April and early May in different places. A point of some interest is that adults leave their hibernating quarters when the temperature is still very low. For all the localities the earliest emergence took place when the mean temperature of the 10-day period was between 0 and 4 C and emergence from hibernation was finished when the temperature was 8-12 C. One should however note that it is not stated whether the temperatures were taken in the places of hibernation or in the open and whether they are based on maxima or minima or how the means are arrived at.

The author does not state the race of *A. maculipennis* on which he worked nor whether several races occurred in the locality. He gives a small amount of information relating to *A. bifurcatus*.

P. A. Burton

LEWIS (D. J.) A Northern Record of *Anophelesambiae* Giles (Dipt. Culicidae). — *Proc Roy Entom Soc London Ser B Taxonomy* 1942 Sept 10 Vol II Pt 9 pp 141-142.

The author records the discovery of *Anophelesambiae* a very few miles north of Wadi Halfa. The locality is within the boundary of the Anglo-Egyptian Sudan but extremely close to that of Egypt. The record extends the known range of this insect towards the north.

P. A. Burton

RUSSELL (Paul F.) & RAO (T. Ramachandra) Observations on Longevity of *Anopheles culicifacies* Imagines. — *Amer J Trop Med* 1942 Sept Vol 22 No 5 pp 517-533 With 2 figs & 3 charts [23 ref.]

Experiments were carried out in a large outdoor screened insectary at Pattukkottai, South India in which conditions were sufficiently normal for breeding to take place and in which climatic conditions were similar to the natural conditions outside. Some ten thousand newly emerged adult mosquitoes (*Anopheles culicifacies*) after dusting with printer's ink powder of various colours were released from May to October and recaptured at frequent intervals. A calf was present for the feeding of the females. Fruit syrup and flowers for the males. The maximum longevity of females varied from 8 to 34 days being longest at the season of slightly lower temperatures and considerably higher humidity. The longest period a male was observed to live was eight days. The numbers always fell off very rapidly, at least 50 per cent of the mosquitoes ceased dying by the third day. The probable duration of life was only two days, the average life span only four days, but in each batch there were always one or two individuals which lived much longer than the rest.

J. B. Whittlesworth

RUSSELL (Paul F) & RAO (T Ramachandra) A Study of Density of *Anopheles culicifacies* In Relation to Malaria Endemicity — *Amer J Trop Med* 1942 Sept Vol 22 No 5 pp 535-558 With 5 figs [22 refs]

Over a period of two years the authors have carried out comparative studies in eight south Indian villages four in the malarious Pattukottai taluk and four in the contiguous non malarious Tanjore delta. In both areas *Anopheles culicifacies* was present and no differences could be detected in morphology ecology behaviour or susceptibility to experimental infection by human plasmodia. But standardized collections by the same workers in human and animal dwellings and in traps of uniform structure expressed on a basis of mosquitoes per man hour indicated that the density of *A. culicifacies* was three to four times greater in the taluk than in the delta. They therefore conclude that the density of the vector is the chief factor in this example of anophelism without malaria. These observations bear out the assumptions of Ross and others that there must be a critical density of an anopheline carrier of malaria below which no transmission of the disease will occur. The difference in the abundance of *A. culicifacies* in the two areas was clearly related to the numbers of available breeding places. Waste fallow lands with pools of irrigation water fallow rice fields and borrow pits were far more plentiful in Pattukkottai than in the delta. *V B Wigglesworth*

AMARAL (Juarez) Infecção natural de *Nissorhynchus Kerteszia* especies *cruzi* e *bellator* (diptera culicidae) Nota previa [Natural Infection of *A. cruzi* and *A. bellator* with Malaria] — *Folia Med* 1942 Aug 5 Vol 23 No 15 p 171

The author has examined 444 specimens of *A. cruzi* and 307 of *A. bellator* in the coastal region of Parana of the former two and of the latter one were found to contain oocysts. It is not certain that they can transmit the infection and proof must wait on the finding of sporozoites. The author notes that his findings were made in a region in which intensive therapy had been practised. *C W*

PEREZ ACOSTA (Francisco) El paludismo Su influencia en la evolución clínica de la gestación y el puerperio [The Influence of Malaria In the Clinical Evolution of Gestation and the Puerperium] — *Rev Med Quirurg de Oriente* Santiago de Cuba 1942 June Vol 3 No 2 pp 78-85

This paper stresses the importance of malaria to the obstetrician practising in a country where malaria is endemic and is based on the notes of 113 patients infected with *P. falciparum* and 30 with *P. vivax* who were admitted to the maternity wards of a hospital during four years. During the early months of gestation malaria may be present in an insidious form and may therefore be overlooked. Abortion caused by malaria is more frequent in the fourth to sixth months of gestation than in the first three months. During the last three months malaria may cause premature birth. In all pregnant women malaria calls for prompt treatment. Malarial eclampsia is not rare convulsions always indicate the necessity for a blood examination as does any febrile manifestation during the puerperium.

Norman White

NAIDU (V R) RAO (A Vasudeva) & RAJAGOPAL (M D) Modified Malaria Flocculation Test—*Jl Indian Med Assoc* 1942 Aug Vol 11 No 11 pp 340-342.

The authors have used for many years the flocculation of serum in distilled water as a test for malaria infection. When no parasites are found in the blood the test is of value. Negative results are significant. An accidental contamination of the distilled water with ethyl alcohol led to the observation that the alcohol had added to the sensitiveness of the test. The solution now used is made by adding 1.5 cc absolute alcohol to 8.5 cc freshly distilled water. The test thus carried out is appreciably more sensitive and only slightly less specific than when distilled water alone is used.

Norman White

SCIENCE 1942 Oct 16 Vol 96 No 2494 Supp pp 10-11—
New Standards adopted for Totaguine

This is a note to record that Dr E F Cook has reported that new standards will shortly be announced in the U S Pharmacopoeia. Lowering the quinine content to 7 per cent allows fuller use of South American barks. The former standard for totaguine required 10 per cent or more of quinine but an upper limit of 12 per cent will now be made so that results of treatment will be more uniform. The former requirement that at least one-quarter of the product be cinchonidine and cinchonine will be completely dropped and the lower limit of 70 per cent total crystallizable alkaloids will now be supplemented by an upper limit of 80 per cent.

At a recent conference on tropical diseases the general opinion was that totaguine is equal to quinine in the treatment of malaria.

C IV

PELNER (Louis) & SASKIN (Edward) Toxic Amaurosis due to Quinine Treatment with Sodium Nitrite Administered Intravenously—*Jl Amer Med Assoc* 1942 Aug 8 Vol 119 No 15 pp 1175-1176 [10 refs]

A Negro woman aged 69 suffered from malaria. Quinine sulphate 5 grains three times a day was given. When she had taken nine doses (45 grains in all) she became totally blind. The pupils were dilated and did not react to light. Examination of the fundi disclosed a condition simulating bilateral occlusion of the central artery. A large area of oedema extended from each optic papilla outwards above and below the macula and beyond it for a distance of about 1 disc diameter. A cherry red spot was seen in each macula. The retinal arteries were contracted the veins somewhat dilated. Prostigmine methylsulphate (1:2000) 2 cc was given hypodermically and 1 grain of sodium nitrite every 10 hours by mouth. There was no apparent effect. Accordingly 1 cc of sodium nitrite solution was given intravenously. This was repeated after four hours. There were almost immediate signs of returning vision. Two further injections of sodium nitrite were administered. A 2 per cent solution of ethylmorphine hydrochloride 1 drop in each eye three times a day was also prescribed. Tablets of vitamin B complex were given on account of the effect it is supposed to have in protecting nerve structures. The response to the nitrite injections was dramatic. Sight was recovered but there was an almost concentric 10 to 15 degrees residual contraction in the visual field of each eye.

Norman White

GEORGEVIC (Ivan) Ueber sog. *kurvierte Malaria und ueber Tertianer*
behandlung [On the So called Larval (Masked) Malaria and
 on the Treatment of Simple Tertian Malaria]—*Deut. Trop.*
Ztschr. 1942 Sept 1 Vol 46 No 17 pp 433-438

This form of malaria easily escapes notice because it is very difficult to recognize and a diagnosis during the latent period can be made only by exclusion. This means that in a patient who has once had malaria all other diseases with similar symptoms must be excluded before a diagnosis of larval or masked malaria can be reached. This type of malaria is usually seen in Croatia during the cold season between the middle of November and the beginning of April. In the spring it is apt to break out into an acute attack. Diagnosis is especially difficult in children because there is nothing characteristic about the blood picture. One must not be misled by hereditary syphilis, chronic gastric or intestinal catarrh, acetonaemia, leukaemia and chronic pneumonia. This necessitates all sorts of elaborate and tedious examinations. The author develops this point and illustrates it by a case which came under his own observation.

Larval (masked) malaria is so resistant to quinine and atabrin that the slight temperature—about 37.2 C—which is frequent in such cases is uninfluenced by these drugs. Only plasmoquine in combination with quinine (quino plasmoquine) will cause the temperature to become normal. The conclusions reached in the first portion of the paper are—

(1) The diagnosis of larval (masked) malaria during the latent period is a tedious matter and can only be reached by means of exclusion.

(2) It is in the latent period very obstinate and is best treated by quino plasmoquine and residence in high mountains.

The next part of the paper deals with points which require attention in the treatment of simple tertian malaria. It is necessary to differentiate between children and adults. In the author's country almost all doctors treat malaria in children with quinine tannate notwithstanding the fact that it is difficult to control even the first attack with this preparation. The author believes that quinine tannate does more harm than good because the malaria parasite is more easily made quinine resistant by it than by other quinine preparations. [No evidence is produced to support this remarkable statement. So far as the reviewer is aware there is no evidence that the malaria parasites ever become quinine resistant. This may occur but the proof is lacking.] If children cannot take quinine hydrochloride or atabrin by the mouth it is better to abandon oral treatment than to use quinine tannate. Georgevic recommends atabrin injections followed by quinine hydrochloride suppositories and during this course of treatment three injections of myosalvarsan.

For adults it is customary to give four tablets of atabrin (1.04 gm) daily as this large dosage considerably reduces the number of relapses. If atabrin is not available large doses of quinine should be accomplished by injections of neosalvarsan as an after treatment. quino plasmoquine is always given. In patients who first come under treatment after they have had several paroxysms the best results are obtained by such energetic treatment. With the atabrin treatment the relapses are reduced to 8 per cent and with the quinine neosalvarsan treatment to 25 per cent.

HUENE (Wolfgang) Ueber Atebrineinwirkungen auf das morphologische Verhalten von *Plasmodium falciparum* [The Morphological Changes in *Plasmodium falciparum* under the Influence of Atebrin.]—*Deut Trop Ztschr* 1940 Aug 1 Vol 46 No 15 pp 385-389 With 9 figs

Reference is made to earlier work of BOCK and others on this subject [this *Bulletin* 1939 Vol 36 p 924]. The author had the opportunity of studying the changes produced by atebrin in a number of pernicious cases of malignant tertian malaria in Greece. The changes were observed in Giemsa stained preparations of the blood and are illustrated by a number of microphotographs. The author gives the following summary of the changes which he observed and which he believes were due to the action of atebrin—

- (1) Swelling of the cytoplasm of young ring forms
- (2) Separation of the nuclei of the young ring forms from the wall of the ring. The nucleus appears as a separate body within the ring
- (3) Complete destruction of the cytoplasm of the young ring forms only the nucleus being left visible in the erythrocytes
- (4) Swelling of the cytoplasm of the half grown forms and the appearance of pigment in the cytoplasm simultaneous swelling of the chromatin
- (5) Fragmentation and destruction of the chromatin massing of pigment on the periphery of the cytoplasm
- (6) The cytoplasm of the half grown forms becomes completely altered aculation sets in and at times is seen in most pronounced degree W. Yorke

AGUILAR MEZA (R.) GONZÁLEZ (E.) & MEDRANO (A. R.) Estudio comparado de la certuna la plasmoguina la atebrina y la quinina como gametocidas [Comparative Study of Certuna Plasmoguine Atebrin and Quinine as Gametocides]—*Bol Oficina Sanitaria Panamericana* 1940 June Vol 21 No 6 pp 549-554 English summary

The title of this paper is not apt. There is very little information of value regarding the relative gametocidal value of the four drugs mentioned but there is a good deal about the prevalence of malaria in a part of Guatemala and about the measures that have been taken in recent years to decrease the prevalence. In 1934 and 1935-36 11 012 and 23 000 blood examinations were made in the rural areas of Quirigua. Those harbouring parasites 1 565 and 3 830 respectively were treated with quinine and plasmoguine. Since 1939 certuna has been used instead of plasmoguine in a number of cases. Gametes disappear some what more rapidly with certuna than with plasmoguine the dose of the former drug given was generally 0.07 gm three times a day for five days for adults. A small amount of anti larval work has been done and flit atomizer pumps have been used with good results. Among the personnel of farms belonging to the Compania Agrícola of Guatemala parasite rates were 15.2 per cent in 1938 6.8 in 1939 and 7.9 in 1940. *P. falciparum* infections are most in evidence. *P. trux* is common. *P. malariae* is relatively rare. *A. albimanus* and *A. punctipennis* are the two most important vectors. Norman White

DAVID (W A L) The Utilisation of Waste Lubricating Oil in Mosquito Larvicides — *Bull Entom Res* 1942 Dec Vol 33 Pt 4 pp 235-240

The author has re-investigated the problem of using waste lubricating oils as constituents for mosquito larvicides. In the past most workers have attempted to use such oils diluted with kerosene alone usually with unsatisfactory results [see this *Bulletin* 1942 Vol 39 p 396]. Recent work on the blending of larvicidal oils has indicated that a suitable mixture should cover a wide distillation range and in this paper the author shows that by combining 10-30 per cent of waste oil with 10-20 per cent of kerosene and 60-75 per cent of diesel oil it is possible to obtain a mixture with adequate toxicity and film stability combined with adequate toxicity. It is therefore not possible to lay down any standard mixture. Satisfactory proportions can only be arrived at by experiment along the lines already described [see this *Bulletin* 1943 Vol 40 p 16].

V B Wigglesworth

HILL (Claire McDowell) Anemia as a Cause of Death in Bird Malaria — *Amer J Hyg* 1942 Sept Vol 36 No 2 pp 143-146 With 2 figs

The daily examination of the blood of eight pigeons which died of *Plasmodium relictum* infection experimentally induced has indicated that anaemia resulting from a reduction in the number of erythrocytes may be regarded as the immediate cause of death.

C M Wenyon

TRYPANOSOMIASIS

LEWIS (E A) Tsetse Flies and Development in Kenya Colony Part I — *East African Agric J* 1942 Vol 7 pp 183-189 [Summary taken from *Vet Bull* 1943 Jan Vol 13 No 1 p 20 Initialled U F R]

An account is given of the species of tsetse flies occurring in Kenya colony their distribution breeding and feeding habits and their influence on soil erosion and agriculture. It is pointed out that fly belts are zones of different dimensions irregular in shape with localities that are either fly free or only occasionally infested and that tsetse flies have their permanent haunts from which they disperse when conditions outside are favourable and to which they return in adverse seasons. A complete tsetse survey has never been undertaken systematically in Kenya but there is evidence that fly encroachment has occurred and that this advance has forced the people into more and more congested areas. It has been suggested that tsetse flies have saved much of Africa from soil erosion by preventing the maintenance of an excessive stock population but that in other areas they have contributed to soil erosion by causing congestion of human beings and stock. It is argued that the view which accepts an injurious pest in the guise of a protector

4
 if the country favours the surrender of trusteeship to an agency which hinders development and which is continually threatening to take possession of additional land. Modern thought tends to favour attempts to bring more land into use by controlled cultivation and clearing to restrict tsetse-infested areas and even to free them from fly so that stock can be reintroduced into them.

LEWIS (E. A.) Tsetse-Flies and Development in Kenya Colony
 Part II—*East African Agric J* 1942 Vol 8 pp 9-14
 [Summary taken from *I et Bull* 1943 Mar Vol 13 No 3
 p 94 Signed U F RICHARDSON]

Increase in stock in Kenya colony due to control of the major diseases has led to an overcroding of stock in areas not infested by tsetse and an excessive use of watering places free from fly with the production of soil erosion whilst stock kept on the fringes of fly belts suffers periodic losses from trypanosomiasis. Fly distribution is still imperfectly known and some confusion has been caused by recording areas as fly infested because animal trypanosomiasis has occurred. Where isolated outbreaks of trypanosomiasis occur they may be due to infection contracted outside the area but when recurrent outbreaks occur careful search usually reveals tsetse infestation. The fly belts are not uniformly infested and areas occur in them where stock can be kept whilst it appears that stock traders know of routes through such areas which can be used with reasonable safety at certain seasons. The majority of tsetse species are dependent on water. *G. longipennis* and *G. longipennis* less so than other species. Most of the large rivers in the colony harbour one or more species of tsetse whilst some species are able to establish themselves near isolated waterholes so that non-infested watering places for stock are restricted and require development.

There is not much concrete evidence of unaided spread of tsetse in Kenya except for seasonal dispersals but spread may occur by the flies following cattle and being carried by road traffic or trains. The alignment of roads for the development of the colony must be so arranged that the tsetse fly situation is not aggravated. Central control of anti fly measures is required as otherwise the expense falls on occupiers of land bordering fly areas who may already be impoverished by losses from trypanosomiasis.

Methods of control consist of evacuating infested areas, clearing of bush (particularly in order to free watering places and road crossings from fly and to attack dry season areas of fly concentration), destruction of wild mammals and trapping.

DUBOIS (A.) & KOHN (I.) Interference thérapeutique entre le bleu de méthylène et l'arsénobenzène chez des animaux infectés de trypanosomes. [Chemiotherapeutische Interference between Methylen Blue and Arsphenamine in Animals Infected with Trypanosomes.]—*Ann Soc Belge de Med Trop* 1940 Sept 30 Vol 20 No 3 pp 257-263

The authors refer to the paper by JANCsó & JANCsó [this Bulletin 1937 Vol. 34 p 129] which showed that the trypanocidal action of trivalent arsenicals could be diminished by the simultaneous administration of compounds with a medium redox potential e.g. toluidine blue. This had been confirmed by the authors [this Bulletin 1940

Vol 37 p 410] and the present paper describes further experiments on the same lines. They find that if mice infected with trypanosomes are treated subcutaneously with neoarsphenamine 0.5 mgm per 20 gm the trypanosomes disappear from the blood in 10 hours. However if the mice receive one hour previously a dose of methylene blue 1 mgm per 20 gm the time required for sterilization is lengthened to 5 hours. Among other substances which were tested ascorbic acid and cysteine were not active in this respect toluidine blue appeared less active than methylene blue while azur I was as effective as the latter. This effect cannot be ascribed to a stimulation of the host's metabolism since it is not produced by thyroxin. [The authors data do not permit any further analysis of the phenomenon which they describe.] *F Harkins*

LEISHMANIASIS

MIRZOLAN (N. A.) Sur l'affection primaire dans la leishmaniose viscérale des enfants [On the Primary Lesion of Visceral Leishmaniasis in Children]—*Med Parasit & Parasitic Dis* Moscow 1941 Vol 10 No 1 [In Russian pp 101-106 With 2 figs French summary p 106]

Having discovered papules containing leishmania on the face of an infant who subsequently developed kala azar and suspecting them to be the primary lesions of this disease the author decided to investigate the question further. In the present paper are described the results of observations on 80 children carried out in course of two years in Samarkand (Central Asia). It would appear that several months before the disease can be diagnosed clinically the earliest symptom in children is manifested in the form of one or more minute papules about the size of a pin head appearing on the face. They increase to the size of a lentil when they are pink or dark red in colour and disappear several months later leaving pigmented spots. Scrapings from these papules and spots contain L.D. bodies. Early papules are not associated with palpable cervical glands but these later increase in size and subsequently the spleen and other lymph glands also become enlarged.

By the time kala azar is clinically recognizable the parasites may be present simultaneously in the papules and pigmented spots on the one hand and in the sternal puncture material on the other (50 per cent of cases) or they may have disappeared from the former. The skin lesions are seen best in children under two years of age with a tender skin and clear complexion. In older children they are more difficult to detect owing to the roughness and pigmentation of their skin.

The possibility of the cases in question representing mixed cutaneous and visceral leishmaniasis is excluded (1) because mixed infections are rare having been recorded only 13 times from Central Asia and (2) because the papules never developed into typical oriental sores (except once). The author believes that the papules develop at the site of the bites by infected sandflies for the following reasons: their appearance coincides with the summer/autumn months they are restricted to the face which is most exposed to bites and scrapings taken from other parts of the skin never revealed L.D. bodies.

These are claimed to be the first observations on the diagnostic features of visceral leishmaniasis preceding the appearance of clinical symptoms. In several cases the detection of the primary skin lesion enabled the author to make an early diagnosis of kala azar (in one case six months in advance) in children and to take them under observation.

C. A. Hoare

LATYSHEV (N.) & KRIUKOVA (A.) [The Present State of the Problem of Cutaneous Leishmaniasis. Pluralism of the Causative Organism] —*Med. Parasit. & Parasitic Dis.* Moscow 1942. Vol. 11. No. 1-2. pp. 74-78. With 2 figs. [In Russian.]

The question regarding the mutual relations between different forms of oriental sore occurring in Turkestan has interested Russian physicians since the end of the last century when some workers recognized two clinical types of the disease. However later workers regarded the disease as one of its various manifestations being attributed to differences in the individual reactions of the human host. Recent investigations carried out independently by the All Union Institute of Experimental Medicine and the Turkmenistan Dermatological Venereological Institute appear to confirm the earlier views for they established the existence in Middle Asia of two forms of the disease.

One of these for which the name Pendeh sore is reserved is a rural type occurring in the sandy deserts and in native villages. It is a typical zoonosis since its reservoir hosts are wild rodents (gerbils and marmots) whose burrows serve as breeding places for the sandfly vector [see also this *Bulletin* 1941 Vol. 39 p. 538, 1943 Vol. 40 p. 24]. The rural disease is seasonal with a maximum incidence in the aestivo-autumnal period. Its incubation period is about 2-3 weeks while the duration is only 3-6 months. The rôle of man as the source of infection appears to be insignificant. In this type of disease which is characterized by an acute course with rapidly ulcerating moist lesions parasites are scanty and complications in the form of lymphangitic nodules are common. Mice are highly susceptible to infection with the parasites.

The second form the Ashkhabad sore is described as the urban type of the disease since it occurs in towns. In the absence of wild rodents within the area of its distribution man is supposed to be the main source of infection. The incidence of this disease is fairly uniform throughout the year. Its incubation period is prolonged (up to several months) and it persists for upwards of one year (occasionally 10 years). This form of cutaneous leishmaniasis which is chronic with retarded papular ulceration is known as the dry type. Parasites are numerous in the lesions and lymphangitic nodules rarely develop. White mice and gerbils become infected with difficulty. When foci of the moist Pendeh sore do occur in townships they are restricted to the periphery where the suburbs merge with the desert. That the two types of leishmaniasis are distinct clinical entities and not the result of variations in the individual susceptibility of the host was established by experimental inoculation of human beings. It was demonstrated that the course of infection in the recipient invariably corresponded to that in the donor.

The form of cutaneous leishmaniasis found in Transcaucasia appears to be of the dry type.

C. A. Hoare

DUBOVSKY (P) *Vaccinotherapy of Cutaneous Leishmaniasis*—*Med Parasit & Parasitic Dis* Moscow 1942 Vol 11 No 1-2 pp 69-74 [In Russian]

The author describes a new method of vaccine treatment against cutaneous leishmaniasis tested by him in Middle Asia. The vaccine was prepared from cultures of *Leishmania tropica* 15 strains of which were isolated from human cases. The parasites were grown in a milk medium with rabbit blood (separated milk filtered through linen distributed in test tubes (6-8 cc) with 0.5-1 cc defibrinated rabbit blood) at 20-22 C. Cultures from 10 to 45 days old were centrifuged and the precipitate was repeatedly (3-4 times) washed in saline after which 2-3 cc saline were added to each tube the contents mixed and poured into a flask with glass beads. The mixture was then inactivated at 60 C for 1 hour. The number of parasites in the vaccine (determined by counting in a haemocytometer) varied between one and five million per 1 cc. After testing for sterility and viability the vaccine was distributed in ampoules (without a preservative) which were kept at 37 C for 7 days. Usually polyvalent vaccines were employed.

The patients comprised 38 cases with lesions from 1½ months to 11 years old in most of which other methods of treatment had been unsuccessful. A first dose of 0.1 cc vaccine was introduced intradermally. If it did not produce a severe reaction or complications the dose was gradually increased. After administration of 0.5 cc subcutaneous injections (up to 20) were made the total amount of vaccine employed for each patient varying from 5 to 20 cc. The case was considered to be cured after the infiltrate was absorbed and the ulcers were healed. In such cases relapses never occurred. General and temperature reactions were rarely observed after vaccination. In the majority of cases there was a local reaction lasting 3-5 days manifested by redness swelling pain and increased discharge from the ulcers.

The results of vaccination were as follows: complete cure in 22 (57.9 per cent) considerable improvement in 7 (18.4 per cent) slight improvement in 6 (15.8 per cent) failure in 3 (7.9 per cent). The negative cases are attributed to insufficient numbers of parasites in the vaccine and to its preparation from old cultures. Conclusions: (1) treatment of oriental sore with leishmanial vaccine succeeded in most cases; (2) the cosmetic effect of treatment was satisfactory; (3) this method of treatment is suitable for out patients; and (4) the dosage of vaccine should be varied in individual cases. C. A. Hoare

FEVERS OF THE TYPHUS GROUP

GRACIAN (Miguel) *Ein einfaches Verfahren zur Färbung der Rickettsien* [A Simple Method of staining Rickettsiae]—*Ztschr f Hyg u Infektionskr* 1942 July 22 Vol 124 No 1 pp 81-82 With 2 figs

The excellent methods of Castaneda and Machiavello are not suitable when large numbers of slides have to be stained daily. The simple Giemsa method does not differentiate clearly between the organisms

[April 1943]

and granular debris. By the method now described the Rickettsiae are deeply stained and show up well against an almost clear background.

- (1) The air-dried film without fixative is soaked in xylol for 3 minutes (in a footnote 10 to 15 minutes treatment with xylol is said to give better results)
- (2) The xylol is drained off and before the film has dried it is flooded for a few moments with two applications of 96 per cent alcohol
- (3) The film is at once washed in tap water and then flooded with a saturated solution of bichromate of potash for 3 minutes
- (4) After thorough washing in tap water it is stained for 10 to 20 minutes with Giemsa's stain (two drops in one cc. distilled water)
- (5) It is then washed in tap water and dried

The author has the impression that the Rickettsiae look larger than when stained with Giemsa in the usual way. He suggests that the method is worth trying for other organisms which are faintly stained with Giemsa. He has found it useful for staining spirochaetes contained in blood films.

John W. D. Meade

PATINO-CAMARGO (Luis). El tifo exantemático en la hoya del Río Cauca. (Exanthematic Typhus in the Valley of the River Cauca (Colombia)).—*Rev. Facul. de Med. Bogotá* 1942 July Vol 11 No 1 pp 13-21

Within 20 months 1,574 cases of fever with 73 deaths were reported from five towns in the valley of the Río Cauca, the total population of the towns was nearly 110,000 and their altitudes ranged from 1,842 to 2,214 metres. The case-fatality rate varied from 2.27 to 18.09 per cent in the different localities.

The disease at first was regarded as typhoid fever but a preliminary estimation of 19 cases yielded 15 positive Weil-Felix reactions to *Proteus O119* at titres of 1-160 or over. All were negative to the Widal test. In several cases Rickettsiae were isolated from the peritoneum and tunica vaginalis of guinea-pigs inoculated with the blood of patients. The arthropod vectors and mammalian reservoirs of infection have not yet been determined.

The average duration of the fever was 10 days, the extremes being 8 and 18 days. The onset and termination of the fever were abrupt. There was a generalized rash extending to the palms and soles, this and the general clinical features were those of a fever of the typhus group.

John W. D. Meade

BOGENDORFER. Beitrag zum Krankheitsbild des Fleckfiebers. [The Symptomatology of Typhus Fever].—*Deut. Militärarz.* 1942 July Vol 7 No 7 pp 455-456

A succinct account is given of the signs and symptoms observed in recent cases of the disease in German soldiers. The rash was often confined to the trunk, it extended to the limbs in half the cases, less frequently to the hands and feet. Some 50 per cent of the patients suffered from bronchitis and about the same proportion had some degree of deafness which might persist during convalescence. The spleen was sometimes palpable but only in the early stages of the attacks. In one patient a fever with five-day periodicity followed the fall of the temperature. This was probably a case of mixed infection with typhus and trench fever. The blood pressure was often low.

even in the mild cases this condition persisted for at least 10 days after the end of the fever later observations were not made because the patients were transferred from the hospital Bradycardia was not uncommon in convalescence this was not due to the effect of digitalis In a few undoubted cases the Weil Felix reaction was persistently negative on the other hand there were cases of fever lasting one or two weeks in which the diagnosis would have been impossible but for the positive reaction

John W D Megaw

HOFF (Ferdinand) & VON BRUNN (E) Krankheitsbild und Differentialdiagnose des Fleckfiebers [The Symptomatology and Differential Diagnosis of Typhus]—*Wien Klin Woch* 1942 Sept 11 Vol 55 No 37 pp 721-726 With 3 charts

Typhus fever now constitutes a real threat to German soldiers and even to the civil population of Germany No less than 10 000 000 cases are said to have occurred in Russia in the years 1919 and 1920

The present article contains little that is new it is based on a thorough study of about 100 cases seen at a hospital attached to a Soviet University

The incubation period is nearly always between 10 and 14 days The spleen is often palpable and tender but only during the first few days Pronounced remissions are often seen during the period of about 10 days of high fever The systolic blood pressure is usually low and may be only slightly higher than the diastolic e.g. $\frac{90}{60}$ or $\frac{80}{50}$ Rapid loss of weight is a special feature of the disease The Weil Felix reaction is of great value in diagnosis but occasionally is negative throughout the course of undoubted cases In one case it was positive soon after the onset then remained negative till after the crisis when it became strongly positive Ambulatory and mild attacks were most frequent in Russians from endemic areas and in immunized persons who often had very severe headache without mental disturbance and a fleeting rash or none at all These mild cases closely simulated influenza Curiously enough the next disease to be mentioned in connexion with differential diagnosis is bacillary dysentery which often had an onset like that of typhus The diseases most often confused with typhus are typhoid and paratyphoid fevers The positive Widal reaction occurring in typhus patients who had been inoculated against typhoid was a source of difficulty titres of 1-200 or over were seen and titres of 1-50 to 1-100 in patients who had not been inoculated

The other diseases that may cause difficulty in diagnosis are—epidemic meningitis sepsis miliary tuberculosis trichiniasis German measles and arsenical drug-eruptions with fever

John W D Megaw

SCHELLER (Emil) Abgekürzte erfolgreiche Behandlung des Fleck typhus. [Successful Abortive Treatment of Typhus Fever]—*Muench Med Woch* 1942 Oct 2 Vol 89 No 40 pp 847-848 [10 refs]

Excellent results are claimed for treatment with chinfortan a combination of quinine and sulphanilamide

The claim is based on experience of 23 cases of which 15 with specially pronounced apathy and somnolence were treated from the

onset. The fever lasted on the average 6.3 days as compared with two control cases occurring at the same time in each of which the fever lasted 13 days and four earlier cases in which the average duration was 20 days.

The treatment consisted of chinurfortan 2 cc thrice daily by intramuscular injection and two tablets of the same drug by the mouth thrice daily. The treatment was continued till the end of the fever.

The total daily dose contained 1.05 grammes quinine and 2.1 grammes sulphanilamide.

[The claim would have been more convincing if alternate cases belonging to the same age group had been treated with the drug.]

John W. D. Megaw

ROTENBURG (S. S.) On the Clinical Aspects of Tick Fever in the Far East—*Med. Parasit. & Parasitic Dis.* Moscow 1941 Vol 10 No 1 pp 116-121. With 2 charts [10 refs.] [In Russian.]

The Far Eastern tick fever is not so well known as other types of this disease. Its causative organism has not been isolated and the reservoir hosts and vectors are unknown. The author records clinical observations on 12 cases carried out in 1939 in the Maritime Province (Primorye). All the patients lived in wooded country, the majority (10) having reported bites by ticks. The primary lesion appearing at the site of the bite consists of an infiltration with a necrotic centre which persists for 9-20 days. The symptoms are described in detail. The character of the rash (roseolate papular), positive Weil-Felix reaction during the second and third weeks, as well as the epidemiological data (appearance of the disease in summer in a locality with ticks in abundance) are all characteristic of tick-borne Rickettsial disease to which the above cases are referred. Though this disease shows points of resemblance with the Siberian tick fever, it was not possible to determine the exact type to which it belongs.

C. I. Hoare

DE MAGALHAES (Octavio) & ROCHA (Adyr) Tifo exantemático do Brasil. Papel do cão (*C. familiaris*) na constituição dos focos da moléstia. [Exanthematic Typhus (Tick-borne) of Brazil.]—*Brasil Medico* 1947 July 25 & Aug 1 Vol 56 Nos 30 & 31 pp 355-358 370-377 [60 refs.]

The domestic dog has already been shown to be a natural reservoir of infection of Brazilian typhus and the blood of dogs has been found to remain infective for a minimum period of 40 days.

The present research deals with the examination of 135 naturally infected dogs from declared foci of the disease in Minas Geraes. Positive Weil-Felix reactions occurred in 79 per cent of the dogs from urban areas, in 90 per cent of those from suburban areas and in 97 per cent of those from the Mataduro municipal area. The tests were made with four strains of *Proteus* organisms OX19, OX2, OX11 and OXK. The highest titre observed for each of the four strains was 1-640, except for one animal in which the titre for OX19 was 1-1,640 and zero for the other three strains. In most of the dogs with positive reactions all four strains were agglutinated in varying titres. Reactions at high titres of 1-160 and over occurred in 33 dogs against *Proteus* OX19, in 29 against *Pr* OX2, in 54 against *Pr* OX11 and in 58 against *Pr* OXK. Four dogs were inoculated with Rickettsiae of the

disease in all four the maximum titres against *Pr OVA* were from 1-80 to 1-160 but no titres exceeding 1-40 were observed against any of the other three strains

Guinea-pigs were inoculated with the blood of 31 dogs and the virus was isolated from 12 of these. The general pattern of the Weil-Felix reactions in animals from which the virus was isolated differed in no way from that observed in animals whose blood gave negative results on inoculation. In both sets of animals the titres for each strain of *Proteus* ranged from zero to 1-640

John W D Megaw

MAZZOTTI (Luis) & VARELA (Gerardo) Reacción de Weil-Felix en perros de la ciudad de México [The Weil-Felix Reaction in Dogs in Mexico City]—Reprinted from *Medicina México* 1942 Apr 10 Vol 22 No 409 pp 135-136

The Weil-Felix reaction with *Proteus OX19* was positive in titres up to 1-80 in 24 of 38 dogs tested

C W

ARNETH (J) Periodisches Fieber (Wolhynisches Fieber Fünftage fieber) im Felde [Trench Fever (Periodic Fever, Wolhynian Fever Five-Day Fever) in the Field]—*Archiv Hoch* 1942 Nov 7 Vol 21 No 45 pp 998-999 [18 refs]

Arneth discusses briefly the leucocyte picture and the treatment of trench fever. Outbreaks have been described recently from several theatres of war: Poland, Russia, Rumania, Italy, France and Belgium.

The blood condition could not be properly investigated in field conditions but the following findings of KARGER are mentioned. By the end of the second week there is leucocytosis with a pronounced Arneth deviation of the neutrophils to the left. During the fever-free periods the leucocytosis is less pronounced but the deviation to the left is still present. Neutrophilic myelocytes appear and there is a great increase in the number of the large mononuclears and large lymphocytes. In one case with a total count of only 7200 the differential count showed—small lymphocytes 15 per cent, large lymphocytes 41 per cent and monocytes 15 per cent. The eosinophiles are often increased even up to 10 per cent.

In cases with an irregular fever curve the blood picture is often very helpful in diagnosis.

The author insists that a qualitative count ought to be made of the lymphocytes and monocytes and that this will show a more or less pronounced increase in both, especially of the larger forms. He suggests that the recurring attacks of fever may prove to be a fruitful field for further study of the stages of development of the monocytes which he regards as being developed from the large lymphocytes.

Treatment by sulphonamides, quinine, atabrin and salvarsan has been useless but the author believes that electrocollargol intravenously has been useful in cases with fever of the relapsing type. Ultra-violet radiation in full erythema-producing doses relieves the severe neuralgic pains; this treatment is combined with subcutaneous or deep injections of local anaesthetic solutions at the points of nerve tenderness. In field conditions injections of morphia may be needed to control the unbearable shin bone pains.

John W D Megaw

DERRICK (E H) SMITH (D J W) & BROWN (H E) Studies in the Epidemiology of Q Fever 9 The Role of the Cow in the Transmission of Human Infection.—*Australian Jl Experim Biol & Med Sci* 1942. June Vol. 20 Pt 2 pp 105-110 With 1 fig

The incidence of Q fever suggests that cattle play an important part in its transmission. All but three of 34 patients living in rural areas had close contact with cattle. Of the 118 Brisbane patients 112 worked at meat works. In Moreton Island many of the bandicoots and their ticks were found to be infected with Q fever yet no human cases occurred. The absence of cattle and scrub ticks (*Ixodes holocyclus*) may account for the failure of the disease to attack human beings.

Two healthy calves were inoculated with liver and spleen emulsion from an infected guinea-pig both calves had a rise of temperature but only on the third day and their illness was very slight. One calf was killed on the fourth day. Two guinea-pigs inoculated with one gramme each of spleen developed obvious Q fever after 10 days. Smaller quantities of spleen and blood caused no reaction. Guinea-pigs were inoculated daily with blood from the other calf the only definite response was in one guinea-pig inoculated with 3 cc blood drawn on the fourth day after inoculation. The serum of this calf agglutinated *Rickettsia burnetii* by the 11th day after inoculation at a titre of 1-10 between the 13th and 18th days the titre was 1-30. Several thousand larval cattle ticks (*Boophilus annulatus microplus*) were fed continuously on the ears of the calf beginning from the time of inoculation. By the 20th day a few of the ticks which had already become adult were found to be infected as shown by positive responses of guinea-pigs inoculated with suspensions made from batches of ticks. Faeces from the collection of ticks were also infective. The offspring of one infected tick were not infective.

Sera of 879 cattle from 16 farms in the endemic area were tested for agglutinins against *R. burnetii*. 13 were positive these came from five farms. The titres ranged from ++ at dilution 1-10 to +++ at 1-30. There was no evidence of previous illness in the reacting cattle.

Human infection may result from—(1) direct attacks by native ticks (*I. holocyclus*) in the absence of cattle (2) direct infection from the body tissues and fluids of infected cattle (3) indirect infection from infected cattle by the tissues or excreta of ticks (especially *B. a. microplus* but perhaps also *Haemaphysalis bispinosa*). The third is probably the most important method of transmission. Inhalation of dried faecal dust of the ticks is a possibility.

The conclusion is that the cow probably plays an important part in the transmission of Q fever to man.

John H. D. Megaw

BARTONELLOSIS

BRUMPT (E) & BRUMPT (L-Ch) VI Etude epidemiologique concernant l'apparition de la verru à du Pérou en Colombie [VI An Epidemiological Study of the Appearance of the Verru of Peru in Colombia]—*Ann Parasit Humaine et Comparée* 1942 Vol 19 No 1-2-3 pp 1-50 With 4 figs & 5 plates [Bibliography]

The authors give a detailed account of their observations made during a ten-day visit to the epidemic zone of Bartonellosis in the

Department of Nariño in Colombia in September 1939. The epidemic began in Nariño in 1936 but its true nature was not discovered until early in 1939 when a commission sent by the Colombian Government established the diagnosis [See this *Bulletin* 1940 Vol 37 pp 71-582-84 1941 Vol 38 p 209]. Finding numerous active cases of the disease still occurring Professor Brumpt and his son were able to confirm the diagnosis by examination of blood smears autopsy material and inoculation of rhesus monkeys. Among the *Phlebotomus* collected in the region and taken back to Paris for classification were found specimens of five different species two of which had not previously been described.

A large part of this report is taken up with a review of the literature on Bartonellosis and a discussion of the possible origins of the Colombian epidemic. It is concluded that the disease is a new one in Nariño and that the original infection probably came from Peru arising possibly from contact between Colombian and Peruvian soldiers along the Putumayo in 1932-34.

The possibilities for prevention of spread of the disease are briefly outlined but appear to offer little hope of success in the present state of our knowledge of the epidemiology. The authors make recommendations for future field and laboratory studies which in their view may yield fruitful results. A number of excellent photographs are included which illustrate clearly the appearance of verrugae both in man and in rhesus monkeys the types of people living in the epidemic area and the precipitous nature of the valleys in the infected region.

Hugh H Smith

YELLOW FEVER

SMITH (E C) & HOWIE (J W). A Yellow Fever Protection Test Survey of One Hundred African Children in Ibadan Nigeria—*Ann Trop Med & Parasit* 1942 Dec 31 Vol 36 No 4 pp 176-178

The authors during 1941 examined sera from 100 African children under 12 years of age by means of the mouse protection test. Four mice were used for each test and when all or three were alive and well on the 10th day the test was regarded as positive the survival of two was considered as partial protection and all other results as negative.

Of the 100 examined all natives of Ibadan 11 gave full protection and nine partial protection and their ages ranged from 5½ to 11½ years. This finding indicates a considerable fall when compared with the 42 per cent obtained by BEEUWAES and MAHAFFY in 1934 for 220 specimens from children up to 14 years [See this *Bulletin* 1934 Vol 31 p 829]. In five of the children with full protection there were histories of illness suggesting yellow fever two having been admitted to hospital suffering from fever and jaundice. A table is given showing the distribution and yearly incidence of fatal cases of yellow fever in Nigeria from 1934 to 1942 inclusive. During these periods there were 30 fatal cases 21 European and 9 African but with one or two possible exceptions there is no evidence of any epidemiological relationship between them.

[April 1943]

The authors also tested 71 of the sera against standard Oxford suspensions of Typhoid Salmonella Proteus and Brucella groups of organisms. Only two gave readings suggesting an infection with Typhoid Salmonella group. Twenty of the 71 sera gave a reading of 1/25 with Proteus XK and four a titre of 1/25 with Proteus 12. All were negative with the Brucella group.

E Hindle

GIBBINS (E. G.) On the Habits and Breeding Places of *Aedes (Stegomyia) simpsoni* Theobald in Uganda—*Ann Trop Med & Parasit* 1942 Dec 31 Vol 36 No 4 pp 151-160 With 2 figs

It is now known that *Aedes simpsoni* is a natural vector of the virus of yellow fever in Uganda. The author gives a brief account of breeding places of the insect in that country.

In Uganda this insect nearly always breeds in the axils of plants though the larvae have occasionally been found in tree holes, a breeding place which is common enough in other parts of Africa. Breeding in axils can only occur in certain plants whose leaf bases are so shaped and wrapped together that they hold water for prolonged periods. There are three common food crops in which the insect often breeds: one particular variety of plantain, an Aroid (*Colocasia*) with an edible root and the pineapple. Breeding also occurs in several other plants. Different parts of Uganda differ greatly from one another in the prevalence of these plants.

The adult mosquito is often common in native gardens but it seems that it never enters villagers' huts or any other type of building. The range of flight appears to be very short. The insect bites by day generally early or late rather than in the middle of the day.

P. A. Burton

HARRIS (William H.) Jr. Comparison of Pathologic Observations in Weil's Disease and in Yellow Fever—*Arch Pathology* 1942 Oct Vol 34 No 4 pp 663-673 With 3 figs [Numerous refs.]

The author made a pathological study of a fatal case of Weil's disease that occurred recently in the neighbourhood of New Orleans and compared his results with stock tissues of two cases of yellow fever obtained locally several decades previously.

The most striking difference noted between the two diseases was the more extensive tissue injury in both the liver and kidneys in the cases of yellow fever. The differences however are known to be variable and should not be considered as pathognomonic. A definite differentiation is afforded by the presence or absence of *Leptospira icterohaemorrhagiae* in Levaditi stained sections.

It is pointed out that Weil's disease is either increasing in the U.S.A. or recognition of the disease is becoming better established.

E Hindle

SANDFLY FEVER

DEMINA (N A) & LEVITANSKAJA (P B) Etude sur la fièvre pappatacci Communication V Essais de culture du virus de la fièvre pappatacci sur la membrane chorio allantoïde de l'embryon de poule [Studies on Pappataci Fever X Attempts to cultivate the Virus on the Chorio Allantois of Chick Embryo]—*Med Parasit & Parasitic Dis* Moscow 1940 Vol 9 No 3 [In Russian pp 272-284 With 9 figs French summary p 284]

Sandfly fever virus in the form of serum taken from patients shortly after a rise of temperature was inoculated in the chorio-allantois of 10 day chick embryos incubated at 38-39 C. Microscopical examination revealed in all cultures a characteristic reaction consisting of proliferation, necrosis and desquamation of the ectodermal cells followed by infiltration of mesoderm and proliferation of the endodermal cells. These changes occur at the site of inoculation and in the adjoining zone being most pronounced after 72 hours culture at 39 C. Controls (chorio-allantois of normal embryos and those inoculated with avirulent sera or neutral mixtures of virulent and immune sera) did not react in the same manner. Injection into seven volunteers of pieces of chorio allantoic membrane taken near the site of inoculation (from primary and sub cultures) failed to produce infection or immunity whereas emulsions both of the whole membrane and of whole embryos infected six and two volunteers respectively with symptoms of typical phlebotomus fever.

C A Hoare

DEMINA (N) Studies on Pappataci Fever XI Further Investigations on the Pappataci Virus in Culture—*Med Parasit & Parasitic Dis* Moscow 1941 Vol 10 No 2 pp 271-283 With 2 figs [In Russian]

Sandfly fever virus inoculated directly into the yolk sac of chick embryos produced cultures in which both the chorio-allantois and embryo were virulent as was demonstrated by successful infection of mental patients. In cultures on the chorio-allantois both this and the embryo proved to be virulent two, three and six days after incubation. A temperature of 37 C appears to be more favourable for the incubation of eggs after inoculation of the virus than 39. The author has grown the virus in chick embryo and its membranes for prolonged periods. Of two strains maintained by her one was virulent after 30 subcultures the other after 26 though in both the virulence was continuously manifested only till the tenth subculture. Later passages behaved in an irregular manner some losing not only their virulence but also their antigenic properties. The virus of early passages proved to be less stable when kept at 2-4 C than virulent serum. When grown by Maitland's method but without addition of serum the cultures remained virulent till the seventh passage.

C A Hoare

DEMINA (N) Studies on Pappataci Fever XII Further Observations on Stability of the Pappataci Virus against Different Chemical and Physical Agents—*Med Parasit & Parasitic Dis* Moscow 1941 Vol 10 No 2 pp 283-287 [In Russian]

In the course of investigations on the attenuation of sandfly fever virus for immunization purposes and on the preservation of the virus

[April 1943]

the following observations were made (1) The virus is inactivated (a) after treatment of virulent serum for 48 hours with commercial formalin (1:1000) (b) after drying the serum in a vacuum-desiccator over both H_2SO_4 and $CaCl_2$ with acetone or with a mixture of phosphates (c) Attempts to adsorb the virus from serum at pH 6.8-6.9 with aluminum hydroxide and kaolin were unsuccessful (3) The virus can be preserved for at least 8 months by drying in the Fiosdori Udd apparatus C. A. Hoare

PLAGUE

BURGA SAavedra (Victor) Dos casos de peste en su forma bubonica tratados con éxito por sulfanazol. Two Cases of Bubonic Plague Successfully Treated with Sulphathiazole. *Actualidad Médica* Lima 1942 June Vol 8 No 2 pp 26-27

Both of these cases of bubonic plague had been proven bacteriologically. The first patient 17 years of age received a total dose of 16 gm sulphathiazole in six days while the second age 21 years after a dose of 10 cc antipneumonic serum received 13 gm sulphathiazole over six days. Both patients recovered completely. W. F. Harney

SAYO (Enrique) & VILLAZÓN (Nestor Morales) Acción de la Sulfanilamida y Sulfapiridina en la peste experimental (Action of Sulphanilamide and Sulphapyridine in Experimental Plague). *Rev. Inst. Bacteriol.* Buenos Aires 1942 Sept Vol 11 No 1 pp 70-78

The drugs were used in suspensions of 30 per cent in 20 per cent gum arabic and were administered subcutaneously or orally. Test guinea pigs were inoculated immediately after injection with a suspension of virulent plague bacilli and were kept under observation for a month. Only sulphanilamide was tried by oral administration and thus was quite efficacious. The minimum lethal dose of plague bacteria rose when given on average to 6-9 colonies and thus caused the death of guinea pigs in three to ten days. Results show that sulphathiazole and sulphapyridine are both superior to sulphanilamide in their power of protection. The authors' conclusions are (1) Sulphanilamide in the doses of 0.5 and 1.5 gm did not protect the guinea pigs against the inoculation of one minimum lethal dose of plague. (2) Sulphathiazole or sulphapyridine protect guinea pigs in some cases even against 10,000 minimum lethal doses. (3) In some cases guinea pigs previously treated with sulphathiazole or sulphapyridine and then inoculated with plague developed a bubonic type of infection or a latent infection (only demonstrable by inoculation of the viscera of these animals into a healthy animal). In some cases this apparent infection could be shown by the simple sowing of the bone marrow on Fildes agar. W. F. Harney

STEWART (M. A.) Carbon Disulphide in the Control of Sylvatic Plague Vectors. *Ann. N. Y. Acad. Sci.* 1942 Vol 36 No 3 Pt 243-246

In former experiments methyl bromide had been found to be the most efficient lethal fumigant out of 13 poisonous gases tested for

dealing with plague rodents and their fleas. The present paper represents a re-examination of the efficacy of carbon disulphide when the liquid is introduced into the ground squirrel burrow in atomized form and the opening closed. The greater cheapness of carbon disulphide and its lesser toxicity to human beings gives it a marked advantage over methyl bromide although it has the disadvantage of being explosive. It can be concluded that fumigation of ground squirrel burrows with even small quantities of carbon disulphide is highly efficient in killing the rodents but the chemical is very uncertain and inefficient in its lethal action on adult fleas on the hosts. Even in amounts as high as 4 ounces per burrow opening it could not be depended on to kill fleas and if amounts greater than this were used it ceased to be cheaper than the more efficient pulicide methyl bromide.

W. F. Harvey

BACILLARY DYSENTERY

DICK (John C.) *Histological Findings in Fatal Cases of Bacillary Dysentery*—*Jl Roy Army Med Corps* 1942 Nov Vol 79 No 5 pp 240-245

This paper presents a valuable summary of the histological pathology of bacillary dysentery as observed in the Middle East.

Tissues from 17 cases were examined and this number as compared with the total incidence of bacillary dysentery for the period under review (January 1st to May 31st 1941) fixes the case mortality rate at less than 1/2 per cent.

Bacteriological findings were necessarily incomplete but *Bact dysenteriae* Shiga 6 Flexner 1 and atypical 1 were isolated.

Duration of the disease for a week or under 3 cases two weeks (11-15 days) 4 three weeks 7 and four weeks (47-70 days) 3.

Large Intestine—In sections of the colon the whole range of acute subacute and chronic inflammatory changes was seen in the mucous and submucous layers. This process was confined to the mucosa and superficial area of the submucosa except where it followed the lymphatic and blood vessels to the deeper zones and for a short distance into the muscular layers. The ganglion cells of Auerbach's plexus were frequently involved in this perilymphangitic inflammation this probably explains the increased irritability of the colon.

Macrophage cells figure prominently in the inflammatory exudate they appear at an early stage in the acute ulcers and are numerous in granular tissue of chronic lesions. Sometimes they are under the peritoneum. In size they are larger than plasma cells 30-40 μ in diameter and often contain ingested red cells polymorphs and cellular fragments. In chronic ulcers the submucosa is replaced by a thick layer of granulation tissue with numerous young capillaries and fibroblasts.

Congestion of blood vessels is marked and interstitial haemorrhages common whilst in fulminant cases there is ample evidence of preformed thrombi in the veins which are held responsible for the pathological changes in the liver and spleen.

Ulceration of the colon is generally most intense in the sigmoid and rectum. Acute inflammatory changes are present in the terminal

[April 1943]

ileum. Inflammatory changes are also found in the mesenteric glands with pronounced macrophage activity. In extremely severe cases fatty changes with some necrosis of liver tissue were noted. The spleen showed changes usually present in septic conditions such as congestion of the pulp and reticulo-endothelial activity. Special attention was paid to the kidneys in which were found significant changes. These were associated with Shiga infections and were especially marked in the early cases of one to two weeks duration. They consisted of patchy glomerular congestion and catarrhal changes especially in the convoluted tubules. The picture on the whole was suggestive of early glomerulo-nephritis.

In others of longer duration from three to four weeks the kidneys were enlarged with increased size and cellularity of the tufts. The first convoluted tubules were either necrosed or showed extensive cloudy swelling.

Signs of kidney lesions were observed in serious cases which eventually recovered such as oedema albuminuria granular casts and increased blood urea. In one case paracolon bacilli were present in the urine. Undoubtedly this nephritis may be a contributory cause of death. The importance of emboli in the liver and spleen is stressed and these may be carried to the lungs causing infarct and broncho-pneumonia.

In a series of the glomeruli of the kidneys by Bact coli and concomitant changes in the convoluted tubules were originally described in chronic Shiga dysentery by J. I. ENRIGHT and the reviewer (see this Bulletin 1919 Vol 13 p 347).

P. Manson Bahr

BREWER (ANGUS E.) The Use of Sulpha-quanidine in Bacillary Dysentery—*Brit Med J* 1943 Jan 9 pp 36-40

These observations were made on a series of 600 patients suffering from bacillary dysentery in a general hospital in the Middle East over a period of eight months. Of these 77 were treated with sulpha-quanidine which was reserved for severe or refractory cases. Twenty six were classified as acute of as chronic. This differentiation was based on the duration of disease all lasting less than two weeks were considered acute the chronic cases lasted from over two weeks to many months.

In the first group toxaemia was severe with frequent stools consisting of blood and mucus only. The majority had received no previous treatment although a few had had castor oil and sodium sulphate. Arbitrary indications were used as a means of gauging dosage of sulpha-quanidine 3.5 gm. four hourly until the patient's general condition showed marked improvement and reduction of stools to five or fewer in 24 hours and they had become semi-solid or 3.5 gm. four times a day until two or three days after the stools had become normal. Treatment with sulpha-quanidine was started with an initial dose of 7 gm in the form of a powder stirred up in 2 oz. of water. In very severe cases this was followed up by 3.5 gm. in 10 hours and again at the same interval. No difficulty was encountered in getting the patients to eat as the desire for food returned invariably in the first 48 hours. Adjuvant treatment consisted of 30,000 units of antiserum in the case of Shiga infections bismuth and chalk and tinct. opii in 10 min doses or gr 1/4 morphine to relieve pain.

Treatment was controlled by sigmoidoscopy. Out of a total of 26 acute cases treated 16 were Shiga six Flexner and four undetermined. 19 were cured of which 11 were severe and eight very severe. The average total dosage in severe cases was 110 gm over nine days in very severe cases 180 gm over 12 days. Two severe Flexner infections treated on the first and second day of onset respectively responded quickly. treatment lasted a week with a total dosage of 91 gm and in spite of the severity of the infection stools were formed without blood on the fifth day.

Seven cases were considered not completely cured five of which were severe two very severe. The average total dosage was 90 gm over six days and the response to treatment was satisfactory relapses however subsequently occurred but colonic wash outs ultimately produced complete healing.

In the chronic series out of 20 cases treated with sulphaguanidine in the same way as the acute cases nine were not cured. In these symptoms returned and sigmoidoscopy showed that although the stools appeared normal the mucosa had not healed. The total daily dosage was therefore raised to 17.5 gm and the course lengthened. Of the 51 chronic cases treated 20 were Shiga infections 14 Flexner and 17 unidentified. The chronic cases were divided into two groups—the first (20 cases) received 90 gm over six days the second (31 cases) 160 gm over 10 days.

Toxic symptoms were rare occurring in only nine patients out of the 51 chronic cases so treated. They comprised rashes nausea headache tachycardia and fever. In all but two cases a dose of at least 100 gm had been given and it was noted that all with toxic symptoms were relatively constipated. It is therefore assumed that the concentration of sulphaguanidine in the bowel was unusually high.

It is concluded that sulphaguanidine like other sulphonamides would appear to be bacteriostatic and the dysentery bacilli gradually die off. Hence an efficient concentration of the drug must be maintained for some time after the active infective process has been inhibited. Such a stage is evidently reached when stools are almost normal so that failure to continue sulphaguanidine makes a relapse likely. The early acute infections showed a quick response to treatment and the longer the interval between the onset of the disease and commencement of treatment the longer was treatment necessary.

In the initial stages of treatment adjuvants such as tinct opii bismuth and chalk and kaolin lessen the frequency of the motions and increase the consistency of the faeces which probably increase the concentration of sulphaguanidine in the bowel.

In chronic cases it would seem that passage of normal stools and disappearance of symptoms indicate only that the infective process has been inhibited but not that healing of the mucosa has taken place and if sulphaguanidine is not continued the infective process may again become active thus delaying healing for some weeks.

P. Manson Bahr

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

SHIH LU CHANG Studies on *Entamoeba histolytica* I Effect of Hydrogen Ion Concentration on Encystation of *E. histolytica* in Culture — *Amer J Trop Med* 1942 Sept Vol 22 No 5 pp 471-483 With 3 figs & 1 plate

The author has studied the influence of pH on the encystment of *Entamoeba histolytica* in culture media by inoculation of amoebae from stabilized culture into a fluid medium consisting of buffered phosphate in sodium chloride solution liver fluid and rice starch. It was first determined that the optimum salt concentration could be attained by a 1/30 phosphate in 0.4 per cent sodium chloride solution giving a salt concentration of 0.87 per cent. The liver extract favours the growth of amoebae but the amount of liver extract required to make up the medium within the ratio of 1:60 to 1:160 to that of the phosphate salt solution affected the encystment only through its effect on the pH values. Amounts of encystment medium of 15-20 ml seem to maintain a favourable pH range better than smaller or larger amounts. On the basis of this study the medium proposed for the encystment of *E. histolytica* is the following. It is composed of 15-20 ml of 1/30 phosphate buffered at pH 7.6 $\frac{1}{2}$ to 1 ml of liver extract fluid and 2-3 loopfuls of rice starch. To assure good results the initial pH of the medium should not be lower than 6.8. It will then be found that after 24, 36 and 48 hours incubation the pH values will be 6.7-6.9, 6.8-7.0 and 6.9-7.2 respectively. Good encystment was always preceded by abundant growth which did not occur until after 24-36 hours of incubation when the pH value of the medium was 6.8-6.9. It was further noted that encystment was best when the rate of growth of the amoebae in the encystment media was definitely greater than it had been in the stabilized culture.

C. W. Henson

MATEVOSSIAN (Sh.) SAPRAISSIAN (M.) & MARKARIAN (A.) On the Existence of Strains of *Entamoeba histolytica* with Different Virulence — *Med. Parasit. & Parasitic Dis.* Moscow 1941 Vol 10 No 2 pp 264-267 [In Russian]

In a previous paper [see this Bulletin 1937 Vol 34 p 376] it was demonstrated that various strains of *Entamoeba histolytica* were pathogenic to kittens irrespective of whether they had been isolated from patients suffering from clinical symptoms or from healthy carriers. The object of the present work was to determine (1) if the severity of symptoms depended on differences in the virulence of the strain of amoebae and (2) the degree of constancy of virulence in different strains. Tests were made with the following five strains: (1) from a carrier; (2) case of chronic amoebiasis; (3) latent amoebiasis; (4) acute amoebiasis; and (5) acute relapsing amoebiasis. Cultures of these strains were inoculated *per rectum* to healthy kittens. The criteria of virulence were: (1) infectivity to kittens (percentage of infected animals); (2) duration of infection in them; (3) character of pathological changes (severity of lesions, depth of penetration of the gut wall). No significant difference was found between any of the five strains as regards virulence and pathogenicity.

C. A. Hoare

GORDON (E) Purification of Sewage from Cysts of Intestinal Protozoa
—*Med Parasit & Parasitic Dis* Moscow 1941 Vol 10 No 2
pp 236-243 [15 refs] [In Russian]

Repeated examination of the Moscow sewage in the course of three years revealed viable cysts of the following intestinal protozoa: *Entamoeba histolytica*, *E. coli*, *Giardia intestinalis*, *Endolimax nana* and *Iodamoeba butschlii*. It has also been demonstrated that after having passed through all stages of purification and when about to be emptied into the river the sewage effluent still contained viable cysts. Since cysts of the dysentery amoeba retain their viability in water for a long time their elimination from sewage is a matter of some importance. With this object in view the author determined the effect upon the cysts of various factors involved in the purification of sewage.

For the detection of cysts the following methods were employed: (1) the effluent was allowed to stand 24 hours after which the lower layer was centrifuged; (2) the effluent was filtered and the deposit collected; (3) it was coagulated with alum and (4) concentrated by flotation with zinc sulphate.

It was found that standing for periods up to 6½ hours with or without coagulation by FeCl_3 failed to eliminate all the cysts from the sewage effluent. On the other hand filtration of sewage through a two metre layer of soil removed them all. It is well known that chlorination of water does not kill the cysts of *E. histolytica*. In the present experiments it was shown that exposure to high concentrations of chlorine (up to 12.7 mgm residual Cl per litre acting for 30 minutes) had no effect upon them.

C. A. Hoare

TSHALAVA (L) A Species of *Entamoeba* detected in Sewage—*Med Parasit & Parasitic Dis* Moscow 1941 Vol 10 No 2 pp 244-252 With 2 plates [13 refs] [In Russian]

In the course of examination of sewage from the Moscow system for evidence of contamination with cysts of intestinal protozoa a free living *Entamoeba* morphologically similar to the human dysentery amoeba was discovered.

Crude sewage was allowed to stand and the effluent fluids were filtered after which the sediment of the former and deposit of the latter were examined microscopically and by cultivation. The examination revealed in addition to various free living protist cysts of *Entamoeba coli*, *Iodamoeba butschlii*, *Endolimax nana* and *Giardia intestinalis* as well as cysts resembling those of *Entamoeba histolytica*. The last named cysts—and later active amoebae—were observed regularly in the course of two years in various parts of the sewer system and at all seasons the total number of strains isolated being fifteen.

The active amoebae measure from 10 to 120 μ , the mean being 25 μ . The ectoplasm is well demarcated from the endoplasm. Movements are very rapid usually in one direction by means of a single pseudopodium. In hypotonic solutions there sometimes appears a structure comparable with a contractile vacuole. The nucleus is typical for the genus: it has a small central karyosome, peripheral chromatin consisting of evenly distributed granules and some chromatin between karyosome and membrane. The majority of amoebae are uninucleate but in cultures there occur large multinucleate individuals with up to 32 nuclei. Cysts measure

5-16 μ in diameter (mean 10 μ) and have from one to four nuclei. There is a large glycogen vacuole especially in young cysts and chromatoid bodies in the form of rods and blocks. When hatched the quadrinucleate amoeba gives rise to eight metacystic amoebae. The amoeba in question can be cultivated not only in the usual media employed for human intestinal protozoa but also in hay infusion and tap-water to which starch is added at temperatures from 15 to 37 C. At 37 C. cultures survived for 2-3 weeks and at room temperature for 2½ months in the same tube. Subcultures were usually made every 10-15 days. The amoebae are viable 20 days at -2 C. and 1½ months at 0-2 C. but they are less resistant to high temperatures 39-40 C. being the maximum tolerated. Attempts to infect kittens with this amoeba failed.

Morphologically it is like the entamoebae of man and cold blooded animals with quadrinucleate cysts its resemblance being especially close to the frog amoeba (*E. ranarum*) which is practically indistinguishable from *E. histolytica*.

In discussing the origin of the sewage amoeba the author rejects the possibility of its being *E. histolytica* in view of its preference for low temperatures. On the other hand its identity with the intestinal amoebae of cold blooded animals is doubted because it appears to be so common everywhere in the sewage than in the effluents from the Zoological Park (the only possible fraction of it).

In view of these facts the amoeba is regarded as a free living coprophilic species of *Entamoeba* for which the name *E. moshkovskii* sp. n. is proposed. The two plates illustrating the paper show amoebae and cysts which (except for the multinucleate forms) are indistinguishable from *E. histolytica* and *E. ranarum*.

[As the occurrence of living *Entamoeba histolytica* in sewage would be of some importance in the epidemiology of human amoebiasis caution should be exercised in accepting the author's interpretation that the new amoeba is a free living form. In this connexion two facts are significant. (1) Among the cysts of human intestinal protozoa recovered from sewage those of true *E. histolytica* are the only ones not mentioned at all though they have been recorded from sewage of the same locality by GORDON (above). It is therefore not improbable that they also occurred in the present author's material. (2) On the other hand the arguments against the possible introduction of *E. ranarum* into the sewage are not sufficiently convincing. It is therefore conceivable that actually cysts of both the human and batrachian amoebae (as well as active forms of the latter) were present in the sewage. The whole question obviously stands in need of critical re-investigation.]

C. A. Hoare

ZATURIAN (A) Diseases caused by Intestinal Protozoa in Erevan.—
Med. Parasit. & Parasitic Dis. Moscow 1941 Vol 10 No 2
 PP 260-264 With 1 chart [In Russian]

Surveys of certain groups of the population of the township of Erevan (Armenian Republic) conducted between 1936 and 1938 revealed a fairly high incidence of infection with intestinal protozoa. The total number of persons examined was about 1600 the majority manifesting some intestinal disorder. *Entamoeba histolytica* was found in up to 33 per cent of whom 16.2 per cent showed intestinal symptoms.

(adults 18.9 per cent children 9.7 per cent) The incidence of amoebiasis was highest in the summer and autumn months reaching a maximum in August Clinically the majority were medium or mild cases The incidence of giardiasis among children reached 20.8 per cent the most vulnerable ages being from 14 to 3 years The percentage of other intestinal protozoa was as follows (the first figure refers to patients with intestinal symptoms the second to healthy adults the third to healthy children) *Entamoeba coli* 16.2 57.4 47.9 *Iodamoeba* 6.6 35.1 33.6 *Endolimax* 3.9 29.0 18.3 *Giardia* 10.6 7.4 17.4 *Trichomonas* 16.5 3.7 13.2 *Chilomastix* 7.1 7.4 8.1 other flagellates 0.1 *Balantidium* 0.1 0.0 protozoa absent from 46.8 24.0 25.3

C. A. Hoare

STSHENNOVITSKH (V) On the Occurrence of *Balantidium coli* and Other Intestinal Protozoa in Man—*Med. Parasit. & Parasitic Dis.* Moscow 1941 Vol 10 No 2 pp 252-260 [27 refs.] [In Russian]

A survey of the population in the Khanlar district of the Azerbaidjan Republic in the course of which over 2 000 persons—mostly Armenians—were examined revealed the following incidence of intestinal protozoa: *Entamoeba histolytica* 33.1 per cent (including 12.5 per cent with small race and 20.6 per cent with large race) *E. coli* 31.3 per cent *Iodamoeba* 23 per cent *Endolimax* 10.7 per cent *Giardia* 12.4 per cent *Chilomastix* 9.4 per cent *Balantidium* 5.1 per cent The incidence of balantidiosis was considerably higher than previously reported for the same region (0.2 per cent) and included a number of symptomless carriers of the ciliate The higher figure recorded in the present investigation is attributed to the examination of freshly passed stools in which the active ciliate is more easily detected The insanitary conditions of the area investigated appear to be particularly favourable for the spread of intestinal infections

C. A. Hoare

ROBERTSON (P. A. M.) A Case of Balantidiosis—*Brit. Med. J.* 1943 Jan 30 p 145

RELAPSING FEVER

MINETT (J. Souttar) Relapsing Fever in Abyssinia—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1942 Nov 30 Vol 36 No 3 pp 189-194

An account of relapsing fever in Abyssinia among a battalion of Gold Coast soldiers from the point of view of the medical officer of the battalion.

During the period 27th June to 12th October 1941 28 bacteriologically confirmed cases of relapsing fever occurred in this battalion when its strength was about 700 In addition there were 12 cases which were almost certainly this disease although spirochaetes were not found in blood films The louse vector was confirmed There were nine fatal cases in six deaths occurred on the second day after

developing in passive immunity were two months old. Each rat received 5 cc of immune serum per 100 gm rat intravenously and one half to two hours thereafter about 5 500 larvae from a mixture of 8 to 11 day-old cultures. The animals were killed at intervals varying from four hours to 16 days after infection. (The immune serum for this series was obtained by pooling the serum from 180 rats over a period of eight months and was used after storage at 6 C from 10 to 18 months. Each of the 180 rats received an initial infection of 5 000 to 7 000 larvae and after two weeks three super infections of the same number of larvae at weekly intervals. They were bled a fortnight after the last infection.) That passive immunity occurred in the rats given 4 and 5 cc of serum is shown by the following facts: (1) eggs appeared in the faeces after a slight delay (approximately one day), (2) the rate of increase in the number of eggs was slower, (3) the total number of eggs passed from the sixth to the tenth day of the infection was smaller and (4) a few more worms were retained in the skin and lungs.

Seven rats were used in the second series of experiments. Each rat received approximately 3 500 larvae from 10 to 11 day old cultures. Four of these rats were injected intraperitoneally from five minutes to one hour before infection with 1, 2, 4 and 8 cc of immune serum respectively. Three rats received no serum. All the rats were killed 10 days after infection.

The six rats of series 3 received an average of 6 000 larvae from 12 to 18 day old cultures. Just before infection three of the rats were injected intraperitoneally with 2, 4 and 8 cc of immune serum respectively. The other three rats received no serum. All the animals were killed after infection.

The following tissues of the above animals were fixed for study: abdominal skin, left lobe of lung, duodenum just below the stomach with the pancreas attached, jejunum at about the position of the second aggregate nodule, jejunum at about one third of the distance to the ileum and ileum at a distance of 10 cm from the caecum. All the tissues were fixed in Helly, Maximow's Zenker formal and were embedded in celloidin and after sectioning were stained with Delafield's haematoxylin and counter stained with eosin and azur II. A lengthy and detailed description of the histological findings is given. It is difficult to epitomize these in a summary of moderate length and they should be consulted in the original by those interested. The paper is beautifully illustrated.

The authors give the following summary of their work:—

Rats were passively immunized so that they exhibited a high but transient immunity as indicated by a delay in the skin of many worms for several hours with a maximum stay of a few worms for 3 days, a delay of about 1 day, a longer delay and slight stunting of many worms in the lungs with the death and encapsulation of a few worms and a delay in arriving in the intestine due to their temporary retention in the skin and lungs, a stunting of the worms with a smaller number of eggs passed during the sixth through the tenth day of the infection and the premature expulsion of a few worms. The effects on the worm such as their immobilization, stunting and the occurrence of precipitate both within and outside of the worm near the body openings are similar to but less in degree than those seen in animals actively immunized by repeated infections with large numbers of larvae. Similarly the inflammatory responses are similar to but less in degree

than those seen in actively immunized rats. Passive immunity appears to be associated with the passive transfer of the hypersensitivity associated with repeated infection. Many of the evidences of immunity seen in the passively immunized animals a week or more after infection are probably due to the supervention of acquired immunity. Among these are the long immobilization and formation of nodules around a few worms in the lung and the later reactions in the intestine.

The histopathological findings especially in the skin and lungs of the passively immunized animals add further evidence of the primary role of antibodies in immunity to *N. muris*. It is not clear however as to whether the difference in intensity of the reactions in passively as compared to actively immunized animals is due solely to an insufficient concentration of antibodies or in part to the lack of previous mobilization of the cells of the lymphoid macrophage system in the local sites of the immune reaction. [See also this *Bulletin* 1941 Vol 38 p 110 1942 Vol 39 p 624] W. Yorke

SHELDON (A. J.) & GROOVER (M. E.) Jr. An Experimental Approach to the Problem of Acquired Immunity in Human Hookworm (*Necator americanus*) Infections—*Amer. J. Hyg.* 1942 Sept Vol 36 No 2 pp 183-186

Populations exposed to large numbers of infective larvae of *Necator americanus* for long periods acquire only moderate or subclinical infections and it has been assumed that they have acquired immunity from previous infections. There is no clear evidence that immunity is thus acquired by man although OTTO and KERR [this *Bulletin* 1939 Vol 36 p 833] have shown that dogs acquire specific immunity after repeated infections with *Ancylostoma caninum*. Their experiments suggest that this immunity depends on a humoral antibody. Otto [this *Bulletin* 1940 Vol 37 p 593] showed that the serum of dogs actively immunized by repeated infections with the larvae of *A. caninum* contained an antibody which produced *in vitro* a typical precipitin reaction around and in the mouth and round the anal and excretory openings of some of the larvae. Sheldon and Groover have tried this reaction in children infected with *N. americanus* and have obtained similar results.

By the Stoll egg count method they estimated the number of hookworms [see this *Bulletin* 1923 Vol 20 p 950] in cases from an untreated group of white and coloured children in Brooks County, Georgia, belonging to the age group 6-19 years, this being the age group showing the highest incidence of hookworms. Infective larvae of *Necator americanus* were partially sterilized by three washes in sterile saline followed by a 30 minute bath of 0.1 per cent mercuric chloride and three further saline washes and were then incubated in sera taken from the infected children with varying hookworm burdens. Larvae were also incubated in sera from uninfected children aged 10-13 from Boston, Mass. who had never been exposed to hookworm infection and in physiological saline. The latter acted as controls.

The larvae in the sera of infected children showed no change until six hours after their incubation in these sera began when some had exsheathed. These exsheathed larvae showed a fine granular deposit round the oral, genital and anal openings. More larvae had exsheathed 7-24 hours after incubation began and some of these showed the deposits. The sheathed larvae showed no such deposits. The deposits did not seem to hinder the activity of the larvae. There were no

further changes 48 hours later when most of the larvae had exsheathed and all seemed to be dead. Death was attributed to the fact that the sera had by then become very viscid.

In all 28 such reactions are tabulated. None of the larvae in the sera from the children never exposed to hookworm infection showed the deposits, but in three sera of children who showed no infection at the time of the experiment the larvae showed deposits and it was presumed that these children had been exposed to infection. Other members of their families were infected. The deposits in and around the larval openings were obtained in eight out of 14 children with very light, light or moderate infections. But in six children with heavy or very heavy infections no deposits were found.

The authors suggest either that the precipitin reaction is not specific or that it is specific but plays no part in acquired immunity, or that it is specific and plays a part in acquired immunity in some cases only. The precipitins do not *in vitro* hinder the activity of the larvae but may *in vivo* immobilize them, stunt them, prevent their assimilation of food and as TALIAFERRO [this Bulletin 1941 Vol 38 p 110] suggested inhibit their enzymes. If they are specific their inconstant presence in the sera of these children is difficult to explain. The authors suggest that factors in the technique and in the host (hereditary variations in titre, individual variation and diet) and in the environment influencing the dissemination of hookworms need to be considered.

G. Lapa

LARSH (John E.) Jr. Transmission from Mother to Offspring of Immunity against the Mouse Cestode *Hymenolepis nana* var. *fraterna* — Amer J Hyg 1942 Sept Vol 36 No 2 pp 197-194

Passive transfer of immunity to parasites from mother to offspring has been comparatively little studied but its occurrence has been shown in infections with *Cysticercus fasciolaris* in rats, *Trichinella spiralis* in rats, rabbits and hamsters and *Trypanosoma lewisi* in rats. It has been shown that *Hymenolepis nana* var. *fraterna* produces a specific immunity in mice that lasts a long time.

The author used eggs of this cestode stored in tap water for 49-72 hours at room temperature because they gave more cysticercoids than eggs taken from fresh faeces or from the proglottids. Eggs were given to mice by stomach tube and the cysticercoids were counted by the method of HUNNEN [see this Bulletin 1936 Vol 33 p 99]. The mice were killed 93 hours after the infection when most of the cysticercoids are mature and have not begun to break out of the intestinal villi into the lumen of the gut. Before the experiments the mice were checked at ten day intervals by D.C.F. to make sure that they were free from helminths.

In the first series of experiments a group of female mice aged three months were infected with *H. nana* var. *fraterna* eggs early in pregnancy and a similar group were not. The young of both groups were then given a test infection. In the young of the infected mothers 0.3 to 2.1 per cent of the eggs given gave rise to cysticercoids while 6 to 8 per cent produced cysticercoids in the young of the uninfected mother. In the second series of three experiments the development of the cysticercoids in two of the young of infected mothers was compared with that in two of the young from uninfected mothers and it was

found that some degree of passive resistance persists for 37-41 days after birth. The author thinks that this is due to the transfer of immune bodies from the mothers to their offspring.

In the third series of experiments mice were used that had been infected but were negative to three examinations by D C F at the time of the experiment. The young of these and the young of uninfected controls were given test doses of eggs. Very few cysticercoids were found in the young of the mothers previously infected. The conclusion was that the young need not be *in utero* to acquire the immunity.

In the fourth series infected and uninfected mothers were interchanged immediately after parturition before the young began to nurse. The number of cysticercoids in the young born of and nursed by uninfected mothers was within the normal range. Young born of infected mothers and nursed by uninfected mother had far fewer cysticercoids but by far the smallest number of cysticercoids was found in the young of uninfected mothers nursed by infected mothers. The conclusion was that the milk played a very important part in the transference of the passive immunity.

Further experiments showed that the young acquire antibodies both from the milk and *in utero* but that the protection acquired from the milk is the better and lasts the longer. Immunity transferred *in utero* disappears 7-9 days after weaning and is not as powerful. The author suggests that his results support other evidence that is accumulating to show that immunity to parasites resembles immunity to bacteria and viruses.

G Lapage

AWAN (Salah H) & ASHOUR (M) Carcinoma of the Pancreas with Bilharzial Infection—*Lab & Med Progress* Cairo 1942 May Vol 3 No 1 pp 20-22 With 1 fig

CHANDLER (Asa C) First Record of a Case of Human Infection with Tapeworms of the Genus *Mesocostoides*—*Amer J Trop Med* 1942 Sept Vol 22 No 5 pp 493-496 With 1 plate [10 refs]

The author records the first known case of infection of man with the cestode *Mesocostoides variabilis*. No adult of this genus has been found before in any primate although the larval stage called the tetrathyridea has been found in a baboon.

The patient was a white child aged 13 months seen at the Tucker Clinic at Nacogdoches in East Texas. There was a history of poor appetite, abdominal pain and loss of weight. The abdomen was tympanitic and slightly prominent and the spleen enlarged. Most of a dose of oleoresin of *Aspidium* was vomited but this dose expelled some worms and pieces of them began to reappear two weeks later. After a second treatment 35 feet of the cestode and other shorter pieces were expelled. No more were seen and the child was normal when it was seen 10 months later.

Chandler recovered four scolices from the material expelled but thinks that more than four cestodes were present. They were larger than but corresponded most closely to *M. variabilis* which Chandler had obtained in 1942 from raccoons in East Texas. A complete description of the species is given because species of this genus are extremely variable in size and have few reliable characters.

In the United States *M. variabilis* has been found in a fox (*Urocyon*) in two genera of skunks (*Spilogale* and *Mephitis*) and in dogs. Other species have been found in the house mouse, kittens, opossums and a lynx. In the Old World species are known from hawks and eagles and all kinds of carnivores. The life cycle is not fully known. The larvae occur in the serous cavities or encysted in various parts of the bodies of reptiles, birds and small mammals. Cats may harbour both larva and adult simultaneously. The human infection recorded here was probably derived from eating improperly cooked flesh of a wild mammal or frog.

Tetrathyridea are long contractile, sparganum-like organisms measuring from 2-5 mm long in reptiles to several cm in mammals. They may be second larval stages like the sparganum stage of Pseudophyllidea infecting transport hosts which enable them to reach carnivores but the first larva is unknown. Tetrathyridea given in their food to suitable carnivores require from two weeks to several months to become adults.

G. Lapeere

HILL (Arthur W.) & ANDREWS (Justin). Relation of Hookworm Burden to Physical Status in Georgia—*Amer J Trop Med* 1942 Sept Vol 22 No 3 pp 499-506 With 2 figs

The programme for the control of hookworm now in action in Georgia emphasizes as the unit of investigation and control the infected family rather than the egg-positive individual. Diseased families are selected by the local health or school personnel. Selection is based first of all on physical evidence of anaemia. The next step is to determine which of the three commonest causes of secondary anaemia in Georgia (dietary iron deficiency, malaria or hookworm) is responsible in each case. Some quantitative approximation is therefore required of the hookworm burden at which the anaemia caused by the worms becomes apparent. To determine this the authors carried out physical examinations and haemoglobin estimations on individuals with varying egg counts.

All the patients examined were whites under 20 years old; the sexes were about equally represented. They lived in four counties of Southern Georgia on the sandy coastal plain where hookworm is highly endemic and malaria is not important. The low income group predominated although all classes were represented. Egg counts were done by the Stoll and Hausheer fall drop dilution method on brine floatation positive. Tetrachlorethylene was used for the removal of hookworm and Blaud's pills to supply iron.

The 1141 haemoglobin estimations done showed that the haemoglobin values decreased as the average egg counts increased, the decrease beginning in the group 2000-4000 egg per cc and becoming marked in the group 4000-8000. Hookworm control is recommended for families of anaemic individuals under 20 years with egg counts of 600 eggs per cc or more.

SMILLIE and AUGUSTINE [this Bulletin 1926 Vol 23 p 772] found no deviation from normal height or weight development when light infections with a average egg counts under 2600 per cc were present although weights and heights were below normal in children with moderate or heavy infestations. The authors' Table 2 shows that a decrease of haemoglobin accompanies a rise of hookworm in Alabama, Mississippi and Georgia, the trends in Georgia and Alabama being most alike. In Mississippi the haemoglobin decreased more rapidly with light infections and showed a lower level

throughout These differences are probably due to anaemia caused by other agents than hookworm They show that local data should be obtained

There was wide variation in individual reactions to worm burdens of about the same magnitude these are probably explained by constitutional and nutritional differences The commonest mild symptoms were pallor of the skin and mucosae and listlessness and increased liability to common illnesses but these were often indistinguishable when the average egg counts were below 8 000 eggs per cc and the haemoglobin above 9 gm per 100 cc More severe cases had blanched conjunctivae and mucosae which finally became light sepia in colour or yellowish Some had light yellow patches on the mucosa of the soft palate and oedema under the eyes about the wrists and ankles and on the backs of the hands and tops of the feet

In the advanced cases 22 of which were studied the egg counts being between 12 400 and 153 000 (average 64 000) the number of erythrocytes varied without relation to the egg counts between 1 2 and 3 8 millions the haemoglobin values were between 2 and 11 gm the colour index below 1 in every case except one (average 0 6) and the white cells were normal Other clinical signs noted were Electrocardiograms were normal Other clinical signs noted were general muscular weakness oedema of the face and extremities tachycardia cardiac murmurs and enlargement of the heart Marked oedema and heart signs were found in patients with haemoglobin values below 5 gm and egg counts above 48 000 excepting one case Winging of the scapulae loss of subcutaneous fat and of muscle tonus are not specific for hookworm disease they were almost always present and were probably due to a heavy worm burden combined with a deficient diet Three-quarters of the patients with heart signs had tongues with smooth margins and other signs of nutritional complications Diets of rural populations were deficient in animal protein iron and vitamins Like the other workers quoted the authors found that recovery was slow if the worms were removed without iron therapy No anthelmintic was given until the haemoglobin had been raised to about 5 gm The cases of two brothers are described to illustrate the disappearance of symptoms and rise of haemoglobin due to iron therapy In one of these the haemoglobin value of 2 gm (with an erythrocyte count of 1 36 millions) had risen after a month of iron therapy to 9 gm and the size of the heart had been markedly reduced After 2 5 cc of tetrachlorethylene 1 378 worms were recovered during three days Two months later the haemoglobin value was 12 gm and the erythrocyte count 4 8 millions The brother had a haemoglobin value of 2 5 gm and an erythrocyte count of 1 9 millions After five weeks of iron therapy the haemoglobin value was 10 gm and the erythrocyte count 3 27 millions After 2 cc of tetrachlorethylene 1 123 worms were recovered After a further three months of iron the haemoglobin value was 12 gm the erythrocyte count 4 78 millions and the heart at first markedly enlarged had returned to normal size

G Lapage

BOVINE (C) Invasion of the Wall of the Human Intestine by *Ancylostomes*—*Amer J Trop Med* 1942 Sept Vol 22 No 5 pp 507-509

In 1937 the author described five cases of invasion of the wall of the small intestine by adult or semi adult ancylostomes [see this

Bulletin 1938 Vol 35 p 277] In all five he found local circumscribed haemorrhage especially in the submucosa with inflammatory reaction rich in eosinophils. In four of the cases there was no connexion between these lesions and the cause of death but in one of them death was due to purulent peritonitis with perforation of the jejunum and the worms could not be excluded as the cause. Invading ancylostomes lay eggs in the loose tissue of the submucosa these and the larvae hatching from them may be seen in large numbers in the submucosa. Usually there is a single haemorrhagic patch containing a single worm eventually accompanied by eggs and larvae but some cases may show a dozen or more of such haemorrhages. The author however never found more than one worm in any single haemorrhage. Very often neither eggs worms nor larvae are found the parasite having probably vacated the lesion and returned to the lumen of the intestine.

From the damaged anterior end of one worm recovered from one only of the five cases described in 1937 SANDGROUND who was visiting Java was able to diagnose it as *Ancylostoma brahense* which is rare in man in Java although it is common in dogs and cats. Five new cases are here described from whom 231 hookworms were recovered from haemorrhages in the intestinal wall. All of these were specimens of *A. duodenale*. This diagnosis was verified by Sandground in one case. All the subjects were Malays except one who was Chinese. In one case a worm was recovered from a haemorrhage in the wall of the colon. In the lumen of the intestine *Necator americanus* *Trichuris trichiura* *Ascaris lumbricoides* *Trichostrongylus colubiformis* *Strongyloides stercoralis* and *Echinostoma ilocanum* were found.

Occasional invasion of the submucosa and sometimes of the muscularis is not specially a characteristic of *A. brahense* but it is remarkable that *Necator americanus* does not thus invade the tissues. Perhaps the reason is the absence of teeth from its buccal capsule. In sections the teeth of *A. duodenale* are seen to be hooked into the tissues and its buccal capsule is filled with tissue. As DARLING pointed out *A. duodenale* is far less common in Java than *N. americanus* especially in the Javanese. [See also this *Bulletin* 1941 Vol 38 p 475]

G Lapee

KASIMOV (G B) The First Case of Ostertagiosis in Man—*Med Parasit & Parasitic Dis* Moscow 1941 Vol 10 No 1 pp 121-123 With 2 figs [In Russian]

Infection with *Ostertagia circumcincta* has so far been recorded from sheep goat cattle and some wild ruminants. The author reports the first finding of this nematode in man. After administration of anti-helminthics the patient a native of Azerbaijan passed in his stool two male specimens (together with several *Trichostrongylus*). The *Ostertagia* is described in detail with two illustrations.

C A Hoare

PETROV (M I) New Case of Loa Infection—*Med Parasit & Parasitic Dis* Moscow 1940 Vol 9 No 4 pp 407-409 With 3 figs [In Russian]

Description of a new case of infection with *Loa extensor* Skriabin 1917 in a woman residing in Daghestan (Caucasus). The infection localized in the buttock had persisted for two years before the patient

herself extracted a single specimen of the nematode from the subcutaneous tissues. A detailed description of the worm with three illustrations is given.

C. A. Hoare

BARLOVATZ (A) Réaction inflammatoire de nodules d *Onchocerca volvulus* au cours de certains états fébriles [Inflammatory Reaction of Nodules of *Onchocerca volvulus* In the Course of Certain Febrile States]—*Ann Soc Belge de Méd Trop* 1940 June 30 Vol 20 No 2 pp 149-155 With 1 chart

In one area of the Congo (not specified) the author saw frequent cases of acute congestion of nodules of *Onchocerca volvulus* (50 cases in three years) although he did not see a single case during a longer stay in another area (not specified) where verbal communications confirmed their rarity. There are few descriptions of such cases in the literature.

Thus acute transient congestion of the nodules often accompanied by congestion of the neighbouring subcutaneous tissues is not part of the normal development of the nodules. Cases may be classified into two groups. In one group no other factor appears to operate. An example of this group is the case of a negro whose tibia was painful all along its length with slight oedema. Two nodules the size of a pin's head had recently appeared on the tibia. The evening temperature was 37.5 C to 38 C. A third nodule appeared after four days. Each nodule contained a small filaria. Excision of all three nodules abolished the pain and for the two following days the temperature did not rise above 37.2 C.

Cases in the second group are more frequent. In these there were large painful filarial cysts surrounded by a zone of congested subcutaneous tissue which was often adherent to the warm skin over it. Usually there were other nodules which showed no inflammatory reaction. In the skin at the site of the inflamed cysts microfilariae were more often absent than present and none could be found in the blood. There was no regularity in the distribution of such inflamed nodules. They were found on the sides of the body, the arms, thighs and legs. Usually there were several, most often four and never more than eight. When they were opened, one or two *Onchocerca volvulus* were found. These were alive or dead and were bathed in thick grey pus with cellular debris and sometimes microfilariae of the *O. volvulus* type. When the pus was sown on to agar or blood agar no bacterial growth resulted. When the cysts ruptured during their removal into the surrounding tissues healing by first intention was not hindered. After their removal the wounds healed in 24 to 48 hours. The pus therefore seemed to be sterile.

In the first series of cases the removal of the cysts led to disappearance of the fever as in the cure of subcutaneous abscesses by incision. In other cases the cysts decreased in size and the pain and subcutaneous reaction disappeared even without removal of the cysts.

But in other cases the fever did not fall after removal of the cysts because some other cause of the fever was present. Four such cases are cited in which the inflammation of the *Onchocerca* nodules preceded the development of typhoid or typhus. The author suggests that the inflammation of the cysts may precede in a similar way the development of other fevers. When inflammation appears it does so practically always at the beginning of the course of such fevers and rarely

later so that the inflammation of the onchocerca nodules may be erroneously regarded as the only cause of the febrile state

G Lapa e

HUITUNEN EKBAUM (E) & MORGAN (E M) The Occurrence of *Enterobius Vermicularis* in the Appendix—*Canadian Public Health Jl* 1942 July Vol 33 No 7 pp 340-343

1 One hundred surgically removed appendices from children of three months to fourteen years of age showed *Enterobius vermicularis* in 34 appendices the incidence being 40 per cent among 45 girls and 29 per cent among 55 boys examined

2 No correlation was found to occur between the presence of *Enterobius vermicularis* and appendicitis The parasite occurred in 27 normal appendices in 5 acute 1 chronic and 1 acute and chronic appendicitis

3 The largest number of pinworms 290 specimens was found in the normal appendix of a 5 year-old girl

4 Ova were found in 6 appendices apparently released from the dead atrophied pinworms The eggs were in the early stage of development

5 Faecaliths were found in 11 acute appendices and 1 normal appendix

MELCHER (Leo R) & CAMPBELL (Dan H) A Serologically Active Polysaccharide from *Trichinella spiralis*—*Science* 1942 Nov 6 Vol 96 No 2497 pp 431-432

Details are given of the preparation of the polysaccharide from worms liberated from hog muscle by peptic digestion these must be sought in the original The final product is a fine white powder which readily dissolves in water it does not give protein reactions but gives the Molisch test in very high dilutions The polysaccharide is a good precipitating antigen and gives precipitates in dilutions of 1 in 200 000 with sera from infected rabbits Cross precipitation does not occur against *Ascaris suum* *Aspistrostrongylus miris* or *Cysticercus fasciatus* Positive skin reactions may be obtained in infected rabbits but require 0.1 to 1.0 mgm of material for good results C H

MAUSS (Elyn A) & OTTO (G F) The Occurrence of *Trichinella spiralis* Larvae in Tissues other than Skeletal Muscles—*Jl Lab & Clin Med* 194 Aug Vol 27 No 11 pp 1384-1387

This paper is reviewed in *Bulletin of Hygiene* 1943 Vol 18 p 97

MUMFIE (C) & SUNDERMANN (A) Zerkinked Trichinosis (On the Clinical Picture of Trichinellosis)—*Monatsh Med Woch* 1943 Aug 28 Vol 89 No 35 pp 758-760 With 2 figs

This paper is reviewed in *Bulletin of Hygiene* 1943 Vol 18 p 208

POHLMANN (Elsabeth) Encephalitis by Trichinosis (Encephalitis in Trichinellosis)—*Monatsh Med Woch* 1942 Aug 8 Vol 89 No 35 pp 760-761 [14 ref.]

This paper is reviewed in *Bulletin of Hygiene* 1943 Vol 18 p 98

- WHITTERIDGE (S Morgan) A Case of *Trichinella spiralis* Infection with Mental Symptoms—*Jl Roy Nav Med Serv* 1942 July Vol 28 No 3 pp 290-293 With 1 chart

This paper is reviewed in *Bulletin of Hygiene* 1943 Vol 18 p 209

- GAASE (A) Die Trichinoseforschung nach dem Schrifttum der letzten Jahre mit besonderer Berücksichtigung eigener Komplementbindungsergebnisse beim Menschen und in Tierversuchen [Investigations of Trichiniasis recorded in Recent Literature with Special Consideration of the Author's Experiences with the Complement Fixation Reaction in Man and Animals]—*Deut Militarärz* 1942 July Vol 7 No 7 pp 442-448 With 3 figs [48 refs]

This paper is reviewed in *Bulletin of Hygiene* 1943 Vol 18 p 209

- GAASE (A) Die Komplementbindungsreaktion auf Trichinose mit dem neuen Schweine-Antigen [The Complement Fixation Reaction in Trichiniasis with a New Pig Antigen]—*Muench Med Woch* 1942 Aug 28 Vol 89 No 35 pp 761-762

This paper is reviewed in *Bulletin of Hygiene* 1943 Vol 18 p 210

HAEMATOLOGY

- TROWELL (H C) The Morphology of the Blood in Dimorphic Anaemia—*Trans Roy Soc Trop Med & Hyg* 1942 Nov 30 Vol 36 No 3 pp 151-176 With 1 diagram [31 ref]

Most cases of anaemia in Africans in Uganda show clear evidence of a dual deficiency namely of iron and the factor concerned in nutritional macrocytic anaemia and such dual deficiency anaemia for which the name dimorphic anaemia is proposed may well be the commonest anaemia of the tropics

Dimorphic anaemia can be diagnosed in the majority of cases from examination of a well stained and well spread blood film. In the central portions of the smear hypochromic cells abound a few are definitely microcytic and less than 5μ in diameter and anisocytosis is but slight. In the tail and edge of the smear the cells are well stained often oval they show no central pallor some are macrocytic exceeding 9μ in diameter and polychromasia is present and may be very marked. It is because of the differential spreading of macrocytes and microcytes that a Price Jones curve taken at one part of the film may be misleading. The bone marrow smear shows megaloblastic normoblastic and hypochromic erythropoiesis the relative degrees depending on whether deficiency of the nutritional macrocytic anaemia factor or of iron predominates. Following the administration of iron in adequate doses there is a reticulocyte response and one of the easiest tests for dimorphic anaemia is to observe whether when this response has subsided crude liver extract will produce a second reticulocytosis.

The commonest cause of deficiency of the nutritional macrocytic factor appeared to be a diet poor in meat and possibly in green vegetables while the cause of the iron deficiency appeared to be a heavy hookworm load and a diet deficient in iron. *F Murgatroyd*

DERMATOLOGY AND FUNGUS DISEASES

AGUIRRE PEQUEÑO (Eduardo) *Mal del pinto (Auto-observación) Empiomas o piote Lesiones de principio Ensayo crítico [Pinta]—Medicina Mexico 1942 Nov 25 Vol 22 No 474 pp 54-590 With 5 fig [83 ref] English summary*

As the full title of this article in the original show the author has written a critical essay on *mal del pinto* particularly on the early manifestations and has carried out inoculations on himself and observed the results for over two years. The article is a discussion of the history of the disease going back to Hernandez account of it published in Mexico in 1615 and bringing the tale down to 194. Apart from the historic narrative which is of transcendent interest there is little to concern readers of the *Bulletin*. The clinical aspect of the findings confirmed by the author experiments on himself clarify some of the doubts as to the singleness of the disease or clinical entity is some prefer.

The author divides the course of the disease as has been customary into three periods. The first is that of the primary lesion or pinta chancre called locally *empiema* or *piote*. The term *empiema* really means a skin eruption usually of a ringworm character. The French *dartre* sometimes used has the same significance. The second is that of dissemination of lesion this has several synonyms the commonest being *empiemas* (in the plural) or *piotes* quite recently the term *pintids* has been given to these secondary lesions. Other names which may be mentioned for this stage are caratides or on the analogy of the syphilitic rash the roseola period. The third stage is that of the pigmentary changes either development of various coloured lesions or achromaticites classed to ether as the dyschromic stage. The paper is well documented throughout and there is an excellent bibliographical reference list.

H Harold Scott

PALMER (Alice E) AMOLCH (Arthur L) & SHAFFER (Loren W) *Histoplasmosis with Mucocutaneous Manifestations Report of a Case—Arch Derm & Syph 1942 May Vol 45 No 5 pp 912-916 With 2 fig*

The case described is an unusual one as the lesions appeared to be limited to ulceration of the lip buccal and pharyngeal mucosa anal region penis and larynx and the suprarenal. There was not extensive involvement of the reticulo-endothelial system throughout the body which is a common feature of the majority of cases reported. The organism was demonstrated in biopsy material removed from the lesions near the mouth and anus. The patient had also a large aneurysm of the ascending aorta and had been receiving energetic arsenic and bismuth anti-syphilitic treatment. When the correct diagnosis was arrived at a course of antimony in the form of neostam was administered. This was followed by sulphathiazole. There was no improvement. The patient became weaker and died. At the post mortem examination the suprarenal were enlarged and the glandular material was almost entirely replaced by caseous like areas. The most careful search failed to reveal any of the organisms in spite of the fact that they had been found during life in biopsy material and had been

successfully cultivated and inoculated to mice. It would seem that they had either disappeared after death or had been eliminated by the therapeutic measures taken.

PARSONS (Robert J) Experimental Histoplasmosis in Mice—*Arch Pathology* 1942 July Vol 34 No 1 pp 229-239 With 2 figs [Refs in footnotes]

The paper describes experiments with *Histoplasma capsulatum* isolated from an ulcer of the nares. The medium inoculated was a dextrose tartaric acid medium the culture being maintained at room temperature. On this medium or on Sabouraud's medium the organism grows for two or three months in the mycelial form throwing up hyphae upon which develop chlamydospores. The author shows that if this mycelial stage is ground up in dextrose infusion broth and is injected intravenously into young mice in a dose of 0.05 to 0.2 cc a generalized infection of the yeast like form develops all organs containing numbers of parasites in cells of the hypertrophied reticulo endothelial system. If the organism is grown on media at body temperature culture of the yeast like form is obtained and thus injected intravenously into mice also gives rise to a generalized infection of similar forms. Injection of the mycelial form intraperitoneally does not give rise to generalized infection though locally yeast like forms can be detected in small numbers. Culture of material from the peritoneal cavity at body temperature will yield cultures of the yeast like stage. It is thus possible by intravenous or intraperitoneal injection of young mice to transform the mycelial stage into the yeast like pathogenic form which is characteristic of the naturally occurring disease in man and animals. Suspensions of the liver and spleen of infected mice regularly produce generalized infections in young mice after intravenous injection. Similarly the author has succeeded on two occasions in infecting young mice by injection of suspensions of lymph nodes removed surgically from one of his patients. It would seem that for the isolation of the organism from certain contaminated lesions the inoculation of mice offers advantages over culture for the mice show a tendency to inhibit or destroy contaminating organisms which interfere with successful culture.

The paper which is illustrated by microphotographs is a useful one from the point of view of diagnosis as certain of the procedures described may be of use for the isolation of the fungus from human cases of histoplasmosis.

C M Henyon

MISCELLANEOUS

ERASMUS (J F P) Tropical Surgery in the East African Campaign—*South African Med J* 1942 Nov 14 Vol 16 No 21 pp 379-382

The author discusses certain surgical conditions peculiar to hot climates the cases from which his experience is drawn occurred in native troops from East and West Africa and in Ethiopians. Under the conditions of the East African campaign ulcers were common. These are divisible into two categories—those due to chiggers and

tropical ulcers. As is well known chiggers may give rise to extensive injuries if appropriate treatment is not given at an early stage. Of the tropical ulcers the author observes that in every case a history of trauma was obtained and points out that no case was seen in the West African troops whose rations were supplemented by a generous supply of palm oil and nuts. nevertheless the aetiology of these ulcers is obscure. He found that excision of the ulcer after separation of sloughs followed by the implantation of pinch grafts a week later was the most satisfactory method of treatment.

Pyomyositis was not rare. 41 cases are reported. The author agrees with those investigators who have been unable to associate this condition with filaria. In every case in the present series *Staphylococcus aureus* was found. He describes an acute non-suppurative stage which may resolve under conservative treatment but in the majority of cases deep-seated abscesses were present which required wide incision. Many of these abscesses were loculated. The common sites were the quadriceps and gluteal muscles but muscles of the arm, abdomen, thorax and neck were occasionally affected. These abscesses frequently give rise to difficulty in diagnosis and have been mistaken for cellulitis, septic arthritis, perinephric abscess and fibro-sarcoma.

Filariasis is discussed at some length and the surgical condition arising from lymphangitis and lymphatic obstruction are described. These descriptions confirm most of the well known work on the subject but mention may be made of the fact that the author reports two cases of intra abdominal abscess which could not be explained except on an underlying filarial basis. Abdominal pain and filarial fever due to iliac adenitis and lymphangitis may cause difficulty in diagnosis. laparotomy has been performed on these findings.

Malaria is important. trivial injuries commonly precipitate attack in chronic sufferer. If operation is to be performed in such people it is well to give a course of quinine beforehand. a few grains given just before operation have proved useful. Almost any acute abdominal condition may be simulated by malaria but it is to be noted that in the author's experience abdominal malaria was not usually accompanied by diarrhoea. In the treatment of ruptured spleen great value has been found in the procedure of transfusion of blood collected from the peritoneal cavity. This blood is not usually clotted except round the raw surface of the spleen. It should be strained through sterile gauze, citrated and injected in the normal manner.

In urological surgery the commonest underlying cause of disease was bilharzia. Guinea worm was very common in West African troops. Crab yaws frequently led to disability in these soldiers. The commonest cause of enlargement of the spleen except malaria was kala azar. Undulant fever giving rise to joint lesions and orchitis was seen in French African troops who had served in Syria.

C II

DOUCET. Note préliminaire sur le traitement des ulcères phagédéniques tropicaux par la bile de boeuf stérilisée. [The Treatment of Phagadenic Ulcer with Sterile Ox Bile. Preliminary Note].—*Ann Soc Bel e de Méd Trop* 1940 Sept 30 Vol 20 No 3 pp 245-247.

The method is to pour on to the ulcers sterile ox bile or to use a dressing saturated with the ox bile twice daily. The bile appears to

digest sloughs and discharges and the bed of the ulcer soon acquires a healthy appearance healing commences rapidly and is usually uninterrupted. The bile has an analgesic action which is appreciated by the patients. There are no adverse effects. The author considers this treatment to be as good as others generally used but points out that it is most valuable in small recent ulcers. His experience was gained from the treatment of 20 cases. C IV

TEY (Antenor) CRISCUOLO (Enso) & MARHUENDA (Perfecto) Le traitement des ulcères torpides cutanées par la vitamine C [The Treatment of Chronic Ulcers by Vitamin C]—*Schweiz Med Woch* 1942 Nov 7 Vol 72 No 45 pp 1242-1245 [36 refs]

The ulcers originated in small wounds and were situated for the most part on the legs. They had long resisted routine treatment. Syphilis, diabetes, renal disease and varicose veins were not factors. The authors found that in the 15 patients recorded there were required on the average 3.066 mgm ascorbic acid to effect saturation, a figure greatly in excess of the normal and it was in the course of investigation of the deficiency of vitamin C by this method that surprisingly rapid healing of the ulcers took place, often within a few days. The method appears to have been to saturate the patient. In one case it is noted that 400 mgm were given daily but in the other cases the full saturation dose is quoted without details of administration. Healing took place in 3-10 days.

The authors discuss the possible mode of action of ascorbic acid and refer to its influence in the healing of wounds. [Perhaps this method may have a use in the treatment of chronic ulcers in the tropics.] C II

REITLER (Rudolph) & BRESH (Simon) Studies on Hepato Llenal Cirrhosis in Eastern Mediterranean Countries—*Trans Roy Soc Trop Med & Hyg* 1942 Nov 30 Vol 36 No 3 pp 177-188 With 2 figs on 1 plate [21 refs]

The disease usually starts in early adult life with moderate enlargement of the liver and periods of irregular fever. The spleen may be just palpable and the blood picture is not characteristic. As the disease progresses the spleen gradually enlarges and a second stage is reached characterized by general debility, abdominal pain, cough and at times mild haemoptysis. There is slight enlargement of the heart, the skin is pale and there may be pellagroid rashes. The blood shows a leucopenia, hypochromic anaemia and thrombocytopenia and the sedimentation rate is very rapid. After some years a third stage is reached when the mechanical effects of cirrhosis become paramount. Ascites develops. Haematemesis is common, the spleen is enormous while the liver may be large or it may have shrunk. This stage lasts for one to three years and death usually occurs from some intercurrent infection. The pathological lesion is a periportal cirrhosis without appreciable damage to the liver cells or the lobular structure.

Malaria, leishmaniasis, schistosomiasis, syphilis and alcohol appear to be excluded as causal factors and the most remarkable aetiological feature is the association with intestinal parasites. Routine examinations of all hospital patients showed 17 per cent to have intestinal helminths whereas among those suffering from hepato llenal cirrhosis

the figure was 47 per cent and 12 per cent also harboured *E. histolytica*. As the clinical picture suggested an infection blood cultures were carried out. During the afebrile periods these were invariably negative but during fever strains of *Staphylococcus pyogenes* (*aureus* and *albus*) were recovered from five patients. On inoculation into rabbits these strains varied in pathogenicity and one of the least pathogenic was used in an attempt to reproduce the disease experimentally. Animals killed one to two months after one or two intravenous injections of this strain showed chronic interstitial pneumonia, reduction in the number of Malpighian bodies of the spleen with enlargement of the sinuses and thickening of the trabeculae while the liver showed strictly periportal infiltrations and only very scanty islets of vacuolized liver cell without infiltrations within the lobules. The appearances were similar to those found in human cases. In contrast injections of enterococci as controls while producing changes in the lungs and spleen similar to those produced by staphylococci resulted in multiple multi-focal abscess in the liver in the intralobular as well as in the peri-lobular tissue.

Intestinal parasitic infections are common to all strata of the population but hepato-splenic cirrhosis is mainly found amongst the poorer rural classes whose diet appeared poor in vitamin A and in proteins. Furthermore two patients had xerophthalmia and several had pellagra-like rash and it is suggested that Mediterranean hepato-splenic cirrhosis is due to staphylococci which gain entrance to the blood stream through minute injuries of the intestinal mucosa caused by intestinal parasites and that the development of the disease is aided by nutritional deficiencies.

F. M. alroyd

LEWIS (D. J.) A Method of transporting Living Mosquito Larvae —
Bull. Entom. Res. 1942 Dec Vol 33 Pt 4 pp 227-228
 With 1 fig.

Larvae stranded on a wet surface in a cool damp atmosphere can be carried alive for many hours or even several days. Perforated trays are made from petrol tins and are lined with cloth. Water containing the larvae is poured in, the water drains away leaving the larvae stranded. A metal cross piece laid on the tray serves to support another tray placed upon it. Eight such trays can be placed in a four gallon petrol tin which is closed with a lid and in hot weather wrapped in a wet towel. If gelatinous algae are present in the water they should be removed since they form a layer which kills the larvae.

The author has used this procedure successfully in the Sudan.

C. H.

KOMP (W. H. W.) A Technique for staining, dissecting and mounting the Male Terminalia of Mosquitoes — *Public Health Rep.* 1942
 Sept 4 Vol 57 No 36 pp 1327-1333 With 2 figs on 1 plate.

The author points out that in many critical cases the identification of mosquitoes may depend on the study of the external sexual organs of the male. Also that though much may be seen by mounting these organs *en bloc* in balsam it is often desirable to dissect them. He then proceeds to describe in detail his methods for staining, dissecting and mounting these organs.

The paper is not one which lends itself to being summarized and attention can be called to one or two points only. The specimens are stained slowly after treatment with sodium hydroxide in a dilute acid fuchsin solution. They are then dehydrated and transferred to clove oil in which they are dissected. Long immersion in clove oil makes the specimen brittle which may be advantageous. For dissection the author uses the smallest size of stainless steel insect pin ground down on a revolving stone under a binocular microscope. In dissection the needle holders are mounted on the stage of the microscope in pillars of plasticine which makes their movements very steady. In order to be able to examine both sides of the specimen a special type of microscope slide made of aluminum has been devised. In the centre of it there is a circular hole slightly recessed and closed by a cover slip. The author mounts the various parts of the male organs in order in separate drops of balsam on this cover slip allows the balsam to dry and then covers the whole with a second cover slip.

It is evident that these methods might be of great value in the study of other small chitinous objects. *P. A. Buxton*

PROCEEDINGS OF THE NEW JERSEY MOSQUITO EXTERMINATION ASSOCIATION 1940 Vol 27 pp 203+3 With 9 plates 1941 Vol 28 pp 211+3 With 8 plates 1942 Vol 29 pp 166+4 With 14 plates — [Mosquito Control Work in 1938-41] [From summary in *Rev. Applied Entom.* Ser. B 1942 Dec Vol 30 Pt 12 pp 187-190]

In *Studies of the Effect of Reduction of Surface Tension on Mosquito Pupae* by M. A. MANZELLI [Vol 28 pp 19-23 3 figs] descriptions are given of the functions of the respiratory trumpets of a mosquito pupa the tips of which normally protrude through the surface film of water and are held there by surface tension enabling the pupa to keep its balance although the top is the heavier part and the mechanism that makes submergence possible. When the surface tension of water is reduced by the addition of a wetting agent all the pupae in it turn on their sides and die in a few hours. Their inability to maintain their equilibrium is not attributable to any toxic action of the chemical as pupae transferred to fresh water after three minutes in water treated with 1 part actual soap per 100 200 400 or 1 000 became normal at once. However while those that had been in the water containing the two lowest concentrations of soap remained normal the other two batches died so that toxic action was involved in the higher concentrations. All pupae that were allowed to remain in any of the soap solutions died. Reduction of surface tension would also cause any egg raft or any female alighting on water for oviposition to sink and would kill larvae that managed to hatch. The use of wetting agents for mosquito control is therefore suggested in places such as barrels where additional dilution cannot occur. A neutral wetting agent is desirable as soap might combine with other substances in the water to form an insoluble material. [See also this *Bulletin* 1942 Vol 39 p 427]

Comparative Resistance of Several Species of Mosquitoes to Larvicides by H. H. STAGE and W. W. YATES [Vol 28 pp 119-126 1 fig] deals with experiments on the toxicity of a pyrethrum larvicide (an emulsion of oil containing pyrethrum extract) a light Diesel oil phenothiazine [a solution consisting of 1 part thiodiphenylamine

20 parts commercial sulphonated petroleum oil and 5 parts acetone) and a Paris green dust to the predominant species of *Aedes Culex Theobaldia* and *Anopheles* occurring in the Pacific North west. Larvae of the four genera showed considerable differences in their resistance to the larvicides in laboratory tests. *Aedes* and *Anopheles* were the least resistant to Diesel oil and *Culex* the most resistant. *Aedes* the least resistant to the pyrethrum larvicide and *Anopheles* the most so. *Anopheles* the least resistant to phenothiazine and Paris green. *Theobaldia* is the most resistant to phenothiazine and the pyrethrum larvicide and *Culex* the most resistant to Paris green. Larvae of *Aedes vexans* Wg. were slightly but consistently more resistant to Diesel oil the pyrethrum larvicide and Paris green than were those of *A. lateralis* Wg. Larvae of *C. pipiens* L. and *C. tarsalis* Coq. showed about the same degree of resistance to the larvicides other than Paris green to which *C. pipiens* was the more resistant. Although there were inconsistencies in the rate of kill it appeared that the four instars of *Aedes Culex* and *Theobaldia* became progressively more resistant to larvicides after each moult but there appeared to be a period just before pupation when resistance was lowered. This period was least marked in *Aedes*. *Anopheles* was not tested. *Aedes* and *Culex* pupae were more resistant to the pyrethrum larvicide than to Diesel oil. *Culex* pupae were somewhat more resistant to Diesel oil and far more resistant to the other larvicide than *Aedes* and *Theobaldia* pupae. *Theobaldia* larvae and pupae were killed in about equal percentages by the larvicides used.

In Factor that may affect the Toxicity of Pyrethrum-oil Emulsions as Mosquito Larvicides also by YATES and STAGE (Vol 28 pp 127-135) tests designed to ascertain the reason for the inconsistency sometimes shown in results obtained with emulsions of oil containing pyrethrum extract as described. The emulsions contained 60 per cent oil and were diluted with nine parts water for application. Typical third and fourth instar larvae of *Aedes vexans* Wg. and *A. lateralis* Wg. or *Theobaldia incidens* Thoms. were used and the tests were carried out at 70°F. The standard emulsion was emulsified with 1 per cent potassium coconut-oil soap. Of other emulsifiers tested, triethanolamine oleate at 3-6 per cent produced an excellent emulsion but reduced toxicity by at least 10 per cent. The same substance at 2 per cent gave an emulsion comparable in character and toxicity with the standard. Calcium caseinate blood albumin egg albumin sodium silicate and bentonite were all tested at a concentration of 2 per cent. Calcium caseinate and bentonite made stable but viscous emulsion which broke too quickly when diluted to be satisfactory. The albumins and sodium silicate made unstable emulsions that soon deteriorated. The albumins and calcium caseinate reduced the kill of mosquito larvae by from 10 to 25 per cent. Bentonite and sodium silicate did not reduce toxicity. Waste liquors (fatty acid and liquid resin) produced by paper mills using pine woods were tested at 1 and 2 per cent and gave emulsions that were equal in every respect to the standard if 1 per cent sodium hydroxide was added. Sulphated alkylated diphenyl sodium lauryl sulphate a sodium salt of an alkylated naphthalene sulphate and several oil-soluble emulsifiers all made satisfactory emulsions and their toxicity compared favourably with the standard soap emulsion. Soap emulsion prepared with 0.5 or 1.5 per cent dry coconut-oil soap 1 per cent potassium fish-oil soap or 0.5 per cent dry coconut-oil soap to which 1 per cent

sodium hydroxide was added were all satisfactory in physical structure and gave satisfactory kills. The addition of 1 per cent of sodium hydroxide did not appear to aid the emulsion in any way except when used with hard or impure water when it retarded the breaking down of the emulsion. No appreciable difference in toxicity was observed between emulsions prepared with Diesel oil, stove oil and kerosene of the specifications of which are given. Several activators including 18 organic compounds mostly oils were tested with the emulsion but since the best of them increased its toxicity only moderately it is doubtful whether their use would be economical. Concentrated standard emulsions were stored at 70 F for several years without losing their toxicity. Emulsions stored at 100 F broke down and lost their toxicity after a few weeks. Those stored at 35 F deteriorated much more slowly. Laboratory tests showed that the toxicity of the emulsion is greatly reduced in water having a temperature below 60 F. The point at which the kill was greatly accelerated lay between 60 and 63 F for *Aedes* larvae and between 65 and 68 F for *Theobaldia* larvae. Heavily polluted water and water containing large amounts of debris required substantially larger amounts of the emulsion per acre to effect satisfactory kills than clear water. Having been treated with 50-60 US gals diluted emulsion per acre they had to be re-treated before kill was satisfactory.

Experiments with three Types of Pyrethrum Oil Emulsions of the New Jersey Mosquito Larvicide by J M GRINBERG [Vol 29 pp 159-162 1 plate] deals with tests of the New Jersey larvicide [a stable emulsion of approximately 66 per cent oil pyrethrum extract about 34 per cent water and 0.5 per cent emulsifier] modified by omitting the water and using emulsifiers soluble in the oil. Such a change would eliminate the danger of freezing during winter storage and reduce volume for storage and transport. If 1-4 per cent of the emulsifier is incorporated a quick breaking emulsion results and with 15-25 per cent emulsifier a permanent or water miscible oil emulsion is obtained. The tests which were made with a stable emulsion (the New Jersey larvicide) a quick breaking emulsion and a permanent emulsion all mixed with water for application in proportions to give concentrations of 6.6 per cent oil and 0.007 per cent pyrethrins dealt with the relationship between the nature of the oil film deposited on water and toxicity to mosquito larvae (third and fourth instars of *Aedes aegypti* L). All were applied at 50 US gals per acre to small dishes of water. The stable emulsion produced the most uniform surface film with oil droplets averaging 3 microns in diameter and gave 100 per cent kill. The quick breaking emulsion which had an average oil droplet size of 15 microns gave only 80-90 per cent kill and the miscible oil the droplets of which were smaller than 1 micron only 60-70 per cent.

SULLIVAN (W N) GOODHUE (L D) & FALES (J H) Toxicity to Adult Mosquitoes of Aerosols produced by Spraying Solutions of Insecticides in Liquefied Gas—*Jl Econom Entom* 1942 Feb Vol 35 No 1 pp 48-51 With 1 fig

Insecticidal sprays as used against mosquitoes are usually produced by hand atomizers or by power equipment. The mist produced is

generally rather coarse and most has settled out in two or three minutes and fails to reach insects in protected places. In this paper the authors describe an improved method by which the insecticide is dispersed in colloidal or aerosol form without the use of power. The insecticide (in this case pyrethrum extract plus sesame oil as an activator) is mixed with liquefied dichlorodifluoromethane (a gas used in refrigerating plants) and introduced into a suitable container provided with a fine nozzle. If the nozzle is opened and the container so held that the liquid comes in contact with the orifice the mixture is expelled at a pressure equal to the vapour pressure of the solvent. In the case of dichlorodifluoromethane this is 52 pounds per square inch at 20°C. The solvent immediately evaporates and leaves the insecticide in colloidal suspension. The dosage is controlled by opening the nozzle for measured periods of time depending on the place to be treated. Good results were obtained against mosquitoes and using heavier doses bed bugs, cockroaches and flies. The insecticide is known to settle out of the atmosphere far more slowly than a kerosene mist. The solvent is non inflammable, non poisonous, non-staining and has no disagreeable odour. The method should therefore be particularly valuable for the destruction of mosquitoes in aircraft.

I. B. McLeserorth

McGOVERN (E. R.) & SULLIVAN (W. V.) Two Activators for Pyrethrins in Fly Sprays.—*Jl Econom Entom* 1942, Oct. Vol 35 No 5 p 792

The two activators are methylphenylhydroxamine and 4 dimethyl cyclohexanol. 3 per cent of the former and 5 per cent of the latter in refined petroleum oil spray containing 0.5 mgm of pyrethrins per cc. gave significant increases in mortality in house flies over the standard pyrethrins in oil used as control. The former is a light brown liquid with a noticeable odour and the spray becomes brownish in the light after a few weeks. It is more efficient than the latter which has no colour or smell. Both were obtained from commercial sources.

C. H.

DUBARRY & GIRAUD-COSTA. Fièvre de trois jours et éruption due aux piqûres répétées de phlébotomes (Harara). [Sandfly Fever and Harara, an Eruption due to Repeated Bites of Phlebotomus].—*Bull Soc Path Exot* 1941 Vol 34 pp 142-153 (Summary taken from *Rev Méd Entom Ser B* 1942 Dec Vol 30 Pt 12 p 177)

The authors describe the dermatitis known as Harara in Palestine and conclude that it is a reaction produced by repeated bites of sandflies in persons who have recently come to the country and have not been long exposed to them. The frequent and simultaneous occurrence of Harara and sandfly (three-day) fever is due to the fact that *Phlebotomus papatasi* Scop. the bites of which cause Harara is also the vector of the fever but Harara is not, as has been assumed, an exanthematic form of sandfly fever nor is it an abnormal form of dengue. [See also this *Bulletin* 1942 Vol 39 p 571]

MARCHIONINI (A) - Zur Klimatophysiologie und pathologie der Haut III Mitt Die Phlebotomenepizoonose (sog Harara) in Anatolien [On the Climatological and Pathological Physiology of the Skin The Affection due to Phlebotomus (known as Harara) in Anatolia]—*Arch f Dermat u Syph* 1941 Vol 182 pp 127-173 [Summary taken from *Rev Applied Entom* Ser B 1942 Dec Vol 30 Pt 12 p 178]

Numerous cases of Harara occur in Anatolia Syria and Palestine during the summer starting at the beginning of the flight period of *Phlebotomus* in the second half of May Clinical data are given The species of *Phlebotomus* in Anatolia are *P papatasi* Scop *P perniciosus* Newst *P minutus* Rond and *P sergenti* Parrot the dermatitis is mainly due to *P papatasi* and was observed to be most prevalent in months in which the temperature favours the development of this sandfly

BIGHAM (John T) *Hippelates* (Eye Gnat) Investigations in the South-eastern States—*Jl Econom Entom* 1941 June Vol 34 No 3 pp 439-444 [13 refs]

The eye gnats (*Hippelates*) of the warmer parts of America are closely related to the eye flies (*Siphunculina*) of Assam and other areas in S E Asia They are extremely irritating and annoying hovering round the eyes and feeding on the edge of the lids and other moist areas Both in America and Asia insects of this type are often stated to transmit epidemic conjunctivitis indeed it seems probable that they do so In the present paper the author adds greatly to our knowledge of the biology of the principal species in the S E United States (*H pusio*)

The author carried out an extensive survey in September and October in several of the south eastern States Florida Texas Georgia etc He found that the flies were invariably absent from areas of heavy or clay soil They were abundant and troublesome on light soil but only if the surface of the earth was bare as it is in certain orange groves and in market gardens It was observed that the gnats are not found at places given over entirely to cattle raising or to the tourist trade

He then carried out an extensive series of observations with traps which were fitted close to the ground and which collected flies emerging from a certain area [The text clearly states that the area was 1 sq ft but the author more than once refers to the area as 1 sq yd The figures for the possible numbers emerging per acre may therefore be misleading.] Placing these traps over soil which had been dug or disturbed he obtained anything up to 500 flies per trap with an average of 24 the work being done at a time when emergence was beginning to come to an end From similar traps set in pine woods or over grass or rotting vegetation and in a number of other specified environments no eye gnats were recovered It appears also to have been demonstrated that within a few hours of land being ploughed large numbers of eggs were being laid in it but that very few were laid after the first week

Evidence of another type was obtained by trapping adults which were persuaded to enter a trap by a bait of decomposed liver and urea In favourable places such as areas devoted to raising celery or citrus

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Tropical Diseases Bulletin

crops provided the ground was worked and not covered with grass
60 000 to 100 000 of these gnats might be taken in a week. But in
forest or grazing land very few or none would be taken.
It is evident that where it is abundant the insect is a most serious
pest. The author speaks of school teachers making use of repellents
and fly prays and of school houses being screened.

P. A. Buxton

J. & FRANKLIN (L. Ben)
Med. Assoc.

Anal Infestation
1942 Sept 1

P A Buxton

TURNBULL (Frederick Wyles) & FRANKLIN (L Ben)
with Screw Worms.—Jt Amer Med Assoc
Vol 120 No 2 pp 117-119 With 3 figs
describe a single case from the
middle ear disease a

Aural Infestation
1942 Sept 12

FRANKELL (Frederick Viles) & FRANKLIN (Frank)
with Screw Worms.—*Jl Amer Med Assoc*
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The author describe a single case from the start The patient
had suffered from chronic middle ear disease and infected mastoid
She was attacked by *Cochliomyia hominivorax* (apparently one only)
which doubtless left larvae in the ear A serous bloodstained liquid
came from the ear 12 hours later In all 39 larvae were recovered by
synergizing P A Buxton

CONJUNCTIVAL MYIASIS due
to *Cochliomyia hominivorax* Ophthalmology 1942 A
[10 refs]

HEDGES (H S) & HUGHES (M H) Jr
Oestrus ~~ovis~~ Report of a Case - Arch
Vol 28 No - pp 221-23 With 1

Conjunctival Myiasis due to
Ophthalmology 1942 Aug
[10 refs]

BOOK REVIEWS

ROCKEFELLER FOUNDATION INTERNATIONAL HEALTH DIVISION
Annual Report 1941—pp ix+244 With 10 fig on 6 plates
New York 49 West 49th Street

ROCKEFELLER FOUNDATION I TERN... With 10 1/2
Annual Report 1941—pp 17+244
New York 49 West 49th Street

In spite of the difficulties entailed by the second World War the International Health Division of the Rockefeller Foundation has as their report shows accomplished a wonderful amount of useful and beneficial work the most important being in connexion with yellow fever influenza malaria typhus diphtheria viruses and nutrition. These make up an imposing list of activities under conditions of world unrest but there were yet other matters to which studies were undertaken and in which research and epidemiological and mental hygiene training for example rabies syphilis tuberculosis schools of hygiene training this apart from aid to various health services. In the following remarks an endeavour will be made to indicate the main lines of progress in the more important subjects.

The writers of the Report state in the opening sentences "Since the opening of the Rockefeller Institute for Medical Research in 1901, the work of the Institute has been directed towards the study of the causes of disease and the development of public health organizations and researches open up new fields of research. It is so it can be only up to us to see how far we can go."

The writers of the Report state in the opening sentences Since both research and development of public health organizations are long time activities from year to year it is so it can be only under Division comprehensive grouping for new researches open up new vistas and new ideas for trying out results and emphasize how great may be the diversity in unity

Starting then with *yellow fever*. An immunity survey showed in 1936 that many in the south western Anglo Egyptian Sudan and some in the north and north west of Uganda had acquired immunity. Early in 1937 fifty four sera from adults in Bwamba County Uganda were examined and 25 gave a positive result. Nevertheless clinical yellow fever was not observed. In two years 1938-39 none of 127 specimens of liver obtained by viscerotomy showed the changes due to yellow fever nevertheless more young children were found immune. Obviously the majority of cases were mild. Six localities were then studied and two clinical cases found and a strain of virus isolated from one of them. The year 1940 marked the end of a seven year period of outbreaks of jungle yellow fever in South Brazil Paraguay and the Argentine. Rio Grande do Sul lies well beyond the traditional range of *Aedes aegypti* and the appearance of yellow fever there was a surprise and showed that jungle yellow fever can persist over the winter months under climatic conditions which would prevent *aegypti* transmitted disease. The Valle do Chanaan where jungle yellow fever was first described in 1932 was again invaded after an interval of eight years and in 1941 jungle yellow fever appeared in that part of Venezuela where *aegypti* transmitted disease (but of jungle origin) had been noted 12 years before.

During April and May of the year under review 1264 blood sera were tested in 30 localities in eastern Panama and 50 were found positive among them sera from a girl of 7 and a boy of 9 years.

Since 1935 the International Health Division had been co operating with South American governments in a combined laboratory clinical entomological and zoological study to clear up the origin of jungle yellow fever. In S America it appears to be a disease of animals especially primates and marsupials and to be transmitted mainly at least by the mosquito *Haemagogus capricornis* a metallic looking blue black insect which lives in the forest and oviposits in water holes in trees. In December 1940 and the following month the virus was found five times in specimens of this mosquito caught in the wild. At this time of the year it cannot be found at ground level but lives in the tree tops [see this *Bulletin* 1942 Vol 39 p 615].

Control was undertaken in various districts after the Sudan outbreak notably in Uganda around Bwamba (more than 100 000 were vaccinated) in Kenya mass vaccination is being performed also in French Equatorial Africa and the Belgian Congo. There having been no important outbreaks of yellow fever in Brazil in 1941 preventive inoculation there was on a smaller scale but many in Bolivia Peru and Colombia were vaccinated.

Research has been taken in hand to elucidate the problem of the jaundice which has followed yellow fever immunization. It is probably due to a virus introduced into the vaccine with the normal human serum. Hence studies have been conducted towards preparing a satisfactory vaccine without any serum. These have led to the use of chicken embryo and vaccines prepared from infective chick juice can be diluted to 10 per cent with saline without appreciable loss of activity.

Much work has been done in investigating *influenza* and considerable additions to medical knowledge have accrued therefrom. The term *influenza* implies rather a clinical syndrome than a clearly defined disease with determined aetiology. A number of outbreaks have been investigated and the results indicate that the aetiology is diverse and

[April 1943]

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BOOK REVIEWS

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In spite of the difficulties entailed by the second World War the International Health Division of the Rockefeller Foundation has as their report hows accomplished a wonderful amount of useful and beneficial work the most important being in connection with yellow fever influenza malaria typhus diphtheria viruses and nutrition. These make up an imposing list of activities under conditions of world unrest but there were yet other matters to which attention was given and in which research and epidemiological studies were undertaken for example rabies syphilis tuberculosis and mental hygiene—all thus apart from and to various health services schools of hygiene training institutions and public health education generally. In the following remarks an endeavour will be made to indicate the main lines of progress in the more important subject.

The writers of the Report state in the opening sentences Since both research and development of public health organizations are long time projects there is of necessity a great similarity in the Division's activities from year to year. If this is so it can be only under widely comprehensive groupings for new researches open up new vistas and new sites for trying out results and emphasize how great may be the diversity in units.

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Much work has been done in investigating *influenza* and considerable additions to medical knowledge have accrued therefrom The term *influenza* implies rather a clinical syndrome than a clearly defined disease with determined aetiology A number of outbreaks have been investigated and the results indicate that the aetiology is diverse and

more than one aetiological variety may occur in a single outbreak. Moreover highly developed antibodies to influenza virus A do not reduce the frequency of influenza B nor *vice versa*. Eight strains of virus A were isolated from patients in the Hawaiian Islands and California their antigenic compositions were similar and closely related to those isolated in 1929 in New York. Vaccines were prepared and their effectiveness was found to vary considerably. The reduction of cases was 19 per cent in Florida groups 50 per cent in Alabama in three out of eleven institutions where they were tried there was no reduction in incidence. It was found possible to give 10-100 times as much antigen if the virus was concentrated in chicken embryo allantoic fluid as had been given in the complex vaccine of the previous year and thus naturally produced a significant increase in antibody response. Also the new virus could be inactivated by heat or formalin without reduction of its antigenic potency. Fortunately the same principles as applied to the A virus were found to hold true of the virus B. In research on immunization by influenza virus vaccines three types of preparation were compared (1) Virus grown in tissue cultures minced chick embryo (2) Allantoic fluid and chorio-allantoic membrane of chick embryo inoculated into the allantoic sac (3) Complex influenza A-distemper vaccine made from chick embryo suspensions. The antibody response to these was compared with that from natural infection and the latter was found to be superior to the first and third but the virus B vaccine prepared in the second manner gave a response almost equal to that resulting from an attack. Plans have been made to test the virus suspensions as a vaccine on a large scale in Oklahoma Georgia Virginia Ohio and New York.

Other studies into which we cannot enter in detail here were undertaken in co-operation with the Minnesota State Department of Health the New York University College of Medicine and the University of Michigan School of Public Health into the efficacy of intranasal vaccination. It was found that in nasal secretions there is a virus inactivating substance with antibody characteristics. Epidemiological studies were also carried out at the Bacteriological Institute Buenos Aires with the co-operation of the Argentine Health authorities.

Important findings have resulted from work on *rabies* and the significance of the Negri body in the diagnosis and epidemiology of the disease. Studies with different groups of animals might reveal anything from 10 to 50 per cent positive by inoculation tests but negative for Negri bodies. The type of dog also plays a part for example 21.4 per cent of dogs with the rabid form but 52 per cent of those with the paralytic form were Negri negative. Animal inoculation though it takes longer is much more accurate for diagnosis than the microscopic method.

Other studies included research into various viruses of *encephalitis*—St Louis Japanese B and a West Nile virus. In *typhus fever* two main objectives were the evaluation of available vaccines and improvement in laboratory experimental methods. The Eastern cotton rat (*Sitomys hispidus hispidus*) proved a much more susceptible animal than the guinea pig hitherto used.

On certain aspects of *malaria* much work was done particularly (from the research aspect) in finding parasitocidal drugs and in studying biological races of mosquitoes. Many drugs relieve the clinical symptoms but leave parasites in the blood which may bring about a

relapse or the patient may become a gametocyte carrier—a potential mosquito vector. As for prophylaxis other drugs though they may prevent the development of clinical malaria do not prevent infection. The study for an efficacious synthetic drug is all the more important at a time like the present when non immune troops refugees and others may be moving through malarious districts and quinine is almost unobtainable. Of more than 80 drugs examined and tested two were found to be distinctly antimalarial in action one a sulphone p p -diacetyldiaminodiphenylsulphone and a closely related compound promin with composition sodium p p diaminodiphenylsulphone N N didextrose sulphonate. Even with the latter the results were not very satisfactory it seemed to work better in negroes than in white people. Sulphadiazine checked the clinical course in 10 out of 13 negroes with acute malaria (one quartan five subtertian and seven benign tertian infections) but had no effect in the other three. Promin has to be given intravenously and is excreted very quickly. At present none of these drugs is to be preferred to quinine and atabrin. Other work has been carried on at the Malaria Research Station Tallahassee Florida at the Johns Hopkins University Baltimore at the Howard University at Chicago University at the Molteni Institute Cambridge England and in India at the Pasteur Institute Coonoor Madras Presidency and elsewhere.

Surveys and control studies in connexion with *A. gambiae* have been undertaken in parts of Brazil and other surveys in Cuba in China in India and in Portugal with control demonstrations and field studies in Georgia N Carolina El Salvador Peru Portugal China and Brazil.

For the no less important field activities and studies in tuberculosis and diphtheria in mental hygiene in nutrition and for the generous aid given to State and local Health Services to laboratories to sanitary engineering to public health education to schools of hygiene and of nursing readers must turn to the detailed Report. In this account the reviewer has tried to indicate a few of the chief lines of work carried out by a body whose benefactions are of permanent service far reaching and of incalculable worth. *H. Harold Scott*

ROCKEFELLER FOUNDATION Annual Report 1941 [Fosdick (Raymond B.) President]—pp xi + 425 With 21 figs on 12 plates New York 49 West 49th Street

WAR OFFICE Memoranda on Medical Diseases in Tropical and Sub-Tropical Areas 1942—305 pp With 77 figs & 35 plates 1942 London H M S O [3s 6d]

The seventh edition of this book is an improvement on the sixth it is some 25 pages longer many additions have been made and there has been some re writing. Sections now included for the first time are those on lymphopathia venereum pellagra rabies rat bite fever and sickle cell anaemia while the Rickettsial diseases are brought together under one heading. It seems a pity however that there should still be two sections for leishmaniasis one for kala azar and the other for oriental sore separated by 48 pages devoted under the alphabetical scheme of classification to malaria myiasis etc. In the preface it is

stated that the book is not claimed to be more than a series of miscellaneous memoranda arranged in alphabetical order but a more ambitious programme could have converted it into a complete text book as it is it can only be regarded as a supplement to larger works which cover the whole field. It is also an unfortunate economy which has decreed that it be bound in paper—books meant for hard use should have strong covers.

Nevertheless the quality of the information and the method of presentation reach a high standard. Much recently reported work has been noted and certain omissions from the previous edition have been rectified. Mistakes are few but the howler on p. 20 has persisted—*Hymenolepis diminuta* and *Dipylidium caninum* are stigmatized as trematodes. Diarrhoea is still ascribed to the swallowing of sand and exposure to chill. It is odd to read on p. 218 that the only geographical distribution of trench fever is apparently in North Africa though this is expanded on p. 226.

C. H.

TROPICAL DISEASES BULLETIN

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RECENT MALARIA WORK IN RUSSIA

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(Wellcome Bureau of Scientific Research London)

During the last three years there have appeared in *Medical Parasitology and Parasitic Diseases*—the journal issued in Moscow by the Central Institute of Malaria and Medical Parasitology (formerly the Institute of Tropical Medicine)—a series of papers devoted to various aspects of malaria. The present review deals with some of the papers published in this journal in 1940, 1941 and 1942.

Clinical Findings

Considerable interest is attached by Russian workers to the determination of the duration of malaria infection, especially of fresh infections but excluding reinfections and relapses. This problem has been investigated by a team working in different parts of the U.S.S.R. as well as by unattached observers. The results obtained by the team (RASHIN, 1941; YAFUSHEVA, 1941; DUKHANINA, 1941; SHCHINIK, 1941; KHOVANSKAIA, 1941; FASTOVSKAIA, 1941) were based on prolonged (2–3 years) epidemiological mass observations analysed and treated statistically. These observations extending from Arkhangelsk in the North to the Caucasus in the South have demonstrated that the duration of B.T. and M.T. infections was the same in different latitudes. It was found that in the majority of cases (90–95 per cent) infection with *P. falciparum* disappears in the course of one year while that with *P. vivax* may last 1½ years. The duration of infection did not exceed these periods even under conditions when there was considerable risk of reinfection. A certain number of cases become symptomless carriers (latent infections) 3–4 months after the attacks have ceased. In this connexion attention is drawn to the necessity of repeated examinations of the blood in persons with a history of recent malaria and especially to the importance of dealing with carriers of M.T. in the spring months. It was demonstrated that prolonged treatment led to a considerable diminution of relapses.

It is concluded from these observations that in the absence of acute manifestations of malaria in the course of one year any attacks occurring in individual cases should be regarded as reinfection.

POLUNO'DVTNOV (1941) maintains that in Central Asia all acute cases of MT observed in the second half of the year should be attributed to fresh infections of the current year. Such cases terminate in May or June of the following year; the duration of the infection thus not exceeding 10-11 months.

FARAFONTOVA (1941) who followed up 472 cases of malaria in Rostov-on Don states that the duration of BT infections did not exceed two years and that of MT one year while the data for quartan malaria were insufficient to warrant any conclusions. Mixed infections—in various combinations—did not last more than two years.

NIKOLAEV (1941) deals with the duration of induced BT malaria transmitted by mosquito bites. Observations on three cases showed that the maximum duration was about 2½ years.

LEVI (1941) criticizes Schilling's method of studying the leucocyte changes in children during malaria which he says cannot be applied either to the control of treatment or for prognosis. According to this author the leucocytic profile [=the plotting of leucocyte counts on curves] alone gives an exact picture of the leucocyte changes in children. It was found that on admission the majority of malarial patients exhibited neutropenia; half of them showed monopenia and a few eosinopenia and lymphopenia.

Treatment and Drug Prophylaxis

Therapeutic and prophylactic treatment with drugs forms the subject matter of the majority of papers under consideration. In describing the action of anti-malarial drugs the Russians employ a terminology which differs somewhat from that used in other countries. Thus the action of drugs upon schizonts or gametocytes in general is described as *schizontropic* and *ametotropic* respectively. The effect of a gametotropic drug is said to be (1) *gametocidal* when it destroys the sexual forms with the result that they disappear from the blood or (2) *gamostatic* when it inhibits the development of the gametocytes which though still present in the blood are rendered incapable of infecting the mosquito.

TIBLER KALIA (1941) compares the results of treatment of induced BT malaria with various combinations of Russian drugs. She found that daily administration of three tablets each containing 0.1 gm acrinine [=atebrin]+0.02 plasmocide [=Fourneau 710] prevented the infection of mosquitoes; the gamostatic effect being evident even 24 hours after the initial dose. Heveicplasmocide alone (0.06 gm per diem) only lowers the infectivity to one third. On the other hand administration of pure quinoline No. 31 (0.06 gm per diem) had a complete gamostatic effect in eight out of nine cases but when combined with acrinine its effectiveness was reduced since about 50 per cent of the mosquitoes became infected. It is concluded (1) that the effect of chemotherapeutic preparations when administered jointly does not represent merely the sum of their individual effects but that there is some interaction between the constituent drugs on the one hand and between these and the host tissues on the other. (2) that combined treatment with acrinine and plasmocide should start as early as possible. It is noted that in combination with acrinine plasmocide loses much of its toxicity, a fact which has also been established by LEVIT (1941) in tests on sparrows and mice.

SOLODOVNIKOV (1941) describes the results of tests on the gamotrophic properties of quinine No 31 in MT malaria when given in doses of 0.03 and 0.06 gm per diem. The results were checked by feeding *Anopheles maculipennis* var *sacharovi* on treated patients. It was found that a single dose of 0.03 gm had a very slight gamostatic effect after 24 hours but two doses administered daily for five days had a considerable gamostatic and gametocidal effect. The latter dosage is accordingly recommended for prophylactic purposes.

One of the effects of gamotrophic drugs being the inhibition of exflagellation of microgametocytes SYRKIN (1941) has devised a method for observing this phenomenon in stained preparations. Blood from an infected bird is mixed with an equal amount of 3.8 per cent citrate in an agglutination tube (about 0.5 cc citrate to 10 drops of blood). The mixture is centrifuged for 15 minutes at 1500 revolutions after which thick films are made from the upper layer of plasma while thin films are made from the lower layer of the deposit. The films are fixed in osmic acid vapour or 96 per cent alcohol and stained by Giemsa's method. When present microgametes (free flagella) will be found in the thick films and these together with exflagellating gametocytes in the thin films.

MALYSHEVA (1940) reports the results of therapeutic and prophylactic treatment with acridine and plasmocide of the population of 2050 in a village in the Kabarda-Balkar republic (Caucasus) where MT is the prevalent form of malaria. No anti-mosquito measures were undertaken but treatment alone brought a diminution in the number of acute cases though it failed to prevent the appearance of fresh infections. It is concluded that in the presence of a high degree of transmission drugs alone are incapable of eradicating the infection.

However ARTYVENKO *et al* (1941) are more optimistic. In certain parts of southern Ukraine where they had been working the chief foci of MT malaria are among the flood banks of rivers where the vast areas involved preclude the adoption of anti-larval measures. The only practicable method of control in these localities is the detection and treatment of all cases. All parasite carriers were accordingly subjected to prolonged anti-relapse treatment with acridine during the greater part of the vernal aestival season. This was combined with prophylactic administration of plasmocide lasting from the period when mosquitoes become infected to the period when they retire to hibernate. These measures have considerably reduced the incidence of malaria and the number of infected mosquitoes and it is claimed that they may eventually lead to the liquidation of the foci of the disease in the country.

GALUSHKINA *et al* (1941) were faced with the same problem on the Dnieper flood banks. As a preliminary test they carried out prophylactic and therapeutic treatment with acridine in two villages in the course of two years. The treatment resulted in a marked diminution of the incidence of malaria. The authors maintain that to be fully effective treatment should be continued for several years. Prophylactic treatment can be restricted to early spring and the second half of summer (August-September) for the same group of people in order to prevent fresh infections during the most dangerous period of the year.

In view of the increased incidence of BT malaria during the aestivo-autumnal period in the northern and central regions of Russia LEVENSON (1940) recommends the introduction of chemoprophylactic

treatment in spring during the pre-epidemic period. Since it is impossible to detect cases with a prolonged incubation period the author advocates that priority of treatment should be given to the inhabitants of those districts and houses where the incidence of malaria was highest in the preceding autumn.

From experience gained in the Adjar Republic [Caucasus] AVALISHVILI (1940) states that although prophylactic treatment with acriquine during the inter epidemic period does not protect against fresh infections or relapses it reduces their numbers and is therefore to be recommended. Preference is given to interrupted treatment (0.2 gm every third day).

ANDRIEY (1940) working in Kazakhstan [Central Asia] confirms the mitigating effect of prophylactic acriquine and suggests that it should be repeated in the course of several successive seasons since treatment during one season is inadequate.

BARDOV (1940) reports successful results of prophylactic and anti-relapse treatment in an endemic malaria area occupied by peat works in the Gorki province. With regard to the general incidence the effect of chemoprophylaxis was more pronounced than that of anti-relapse treatment in the spring. In both forms of treatment acriquine produced better results than quinine.

KRANZFELD (1940) employed prophylactic treatment with acriquine among the Volga navvies who on account of their work and mode of living are particularly exposed to infection. Observations carried out in the course of one year on 300 persons showed that the incidence of malaria in those who had been treated fell to 8.9 per cent as compared with 26.2 per cent in control groups.

Working in the Middle Volga region where both B.T. and M.T. forms of malaria are endemic POLUMORDVINOV (1940) compared the results of two methods of chemoprophylaxis in the absence of mosquito control. In one 0.3 gm acriquine was given on two consecutive days followed by an interval of eight days; in the other 0.2 gm acriquine + 0.04 gm phismocide were given on two consecutive days with an interval of four days. The results of both methods were alike; they reduced the incidence of infection by half.

KHOVANSKAYA (1940) reports the results of prophylactic treatment in an estate of Tambov province (population 684) with a high incidence of M.T. and B.T. malaria (over 60 per cent). Acriquine administered in doses of 0.2 gm on three consecutive days followed by an interval of seven days proved to be ineffective in the absence of anti-mosquito measures.

SAFRONOV (1940) obtained good results with prophylactic treatment of a community in the Transbaikalian region using acriquine in doses of 0.1 gm twice a day followed by intervals of four days. There was a considerable fall in case-incidence as compared with a neighbouring community not dealt with.

Control

NABOKOV and ZAVYALOV (1941) discuss the conditions obtained in barrage-lakes covering a large area and comprising numerous bays etc. which favour mosquito breeding. It is pointed out that the changeable character of such water collections (fluctuation in water level, amount of vegetation and so forth) and the presence of various obstacles (such as tree stumps) may interfere with anti-larval measures.

It is suggested that more care should be taken in the early operations in order to ensure more adequate control of all parts of the system

MIKHAILOV (1942) notes that the hydrotechnical measures under taken since 1934 in Mariupol on the Sea of Azov coast and comprising the drainage and filling in of anophelogenous swamps have resulted in a marked diminution of malaria incidence *in* from 2 626 cases in 1935 to 390 in 1939

SABANEYEV and SMIRNOV (1942) deal with hydrotechnical work in the flood plain of the river Samarka which aimed mainly at the reduction of the surface of water collections by filling in by drainage and by connecting them by canals emptying into the river

From experience obtained in the Ukraine OICHINNIKOV and TSHTENKO (1940) recommend periodical flushing of small rivers and canals for the destruction of anopheline larvae The flush is controlled by dams or locks the larvae being washed off and carried away by the current and then left dry on the banks when the water recedes

LARIUKHIN (1942a) tested the larvicidal properties of oiled dust mixtures consisting of 1 kgm Paris green mixed with 19 kgm talcum or road dust with the addition of 2.2 to 3.8 per cent masut or solar oil (=pyronaphtha) The efficiency and the duration of toxic action of this composition upon anopheline larvae under field conditions were almost equivalent to those of unoled preparations In another paper this author (LARIUKHIN 1942b) recommends a different larvicidal suspension which was successfully employed under field conditions The proportions required per hectare are as follows Paris green 0.8-1 kgm kerosene 2.5-5 litres and water 250 litres

In an endeavour to utilize the local Altai products SHESTERIAKOVA and BUSHUROVA (1942) tested light tar a liquid by product of the tar turpentine industrial process as well as certain plants The tar proved to be highly larvicidal in quantities of 300 gm per sq metre but since it is lethal to aquatic plants and animals it can be applied only to water collections of no economic importance Among plants powdered *Pyrethrum* sp and *Cicuta virosa* appeared to be promising whereas *Thermopsis lanceolata* and *Hyoscyamus niger* had no larvicidal effect

GRECHIN and BIELSKAYA (1942) have employed with success a larvicide made with an arsenical ooze obtained as a by product from chemical works This substance (containing 10.6 per cent arsenic trioxide and 7.8 per cent arsenic pentoxide) when dried and powdered can be mixed with a threefold amount of dust and used in doses of 3 kgm per hectare for ordinary dusting or it can be mixed with 2 per cent petroleum for spraying from aeroplanes in doses from 1 to 2 kgm per hectare

SHIMANSKY (1942) describes a new pneumatic sprinkler for liquid larvicides which can be used from a boat or cart Working in the Ukraine in large anophelogenous areas overgrown with vegetation and unsuitable for drainage or dusting NIKULIN (1941) believes that in such localities it is more practicable to control the adult mosquitoes than the aquatic stages This is done by catching them daily in the dwellings

LAZEBNY (1941) describes the successful application of this method in two settlements in the Crimea In this campaign the local population—mainly housewives—took a prominent part thus releasing professional bonificators for more important duties The women were trained to detect and destroy the mosquitoes in their homes in the

course of their daily domestic duties. These measures brought about a considerable reduction in the number of mosquitoes in the dwellings (as shown by comparison with a control house) and resulted in a fall in the incidence of malaria in the localities in question.

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SLVIMAR: OF RECENT ABSTRACTS *

IV TRYPANOSOMIASIS

Aetiology Transmission

ZSCHUCKE (p 605) has examined strains of *T. gambiense* from the island of Fernando Po where the disease has been known for over a century. In 1929 he failed to find posterior nuclear forms in infected.

The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin* 1947 Vol 39. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

course of their daily domestic duties. These measures brought about a considerable reduction in the number of mosquitoes in the dwellings (as shown by comparison with a control house) and resulted in a fall in the incidence of malaria in the localities in question.

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SUMMARY OF RECENT ABSTRACTS *

IV TRYPANOSOMIASIS

Actiology Transmission

ZSCHUCKE (p 605) has examined strains of *T. gambiense* from the island of Fernando Po where the disease has been known for over a century. In 1929 he failed to find posterior nuclear forms in infected

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course of their daily domestic duties. These measures brought about a considerable reduction in the number of mosquitoes in the dwellings (as shown by comparison with a control house) and resulted in a fall in the incidence of malaria in the localities in question.

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An extensive review appearing in the journal under consideration is devoted to an important publication by STACKELBERG (1940) *Bibliography of Malaria* which deals with the literature on the epidemiology, parasitology, transmission and prophylaxis of malaria in U.S.S.R. the references being not only to Russian, but also to foreign work. This monumental volume covering the literature of the last 165 years and comprising 7053 references will form a unique and valuable addition to medical bibliography. It is not clear whether this publication can be readily obtained for although its price (95 Roubles) is marked it is said to be. For official use.

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mice and guinea-pigs but 10 years later he repeated this work and saw the *e* forms in 6 of 10 strains investigated though in very small numbers. In mice they were only present after intracerebral inoculation or after intravenous inoculation in animals which had received intracerebral injection of 2 per cent starch solution. He concludes that the trypanosome has become more virulent in the last 10 years and relates this to the continued introduction of susceptible native into the island. These facts furnish additional evidence of the identity of *T. gambiense* and *T. rhodesiense*.

ROUBAUD and PROVOST (p. 234) trace the course of infection in mice with a strain of *T. gambiense* which shows great irregularity in its pathogenic effects in those animals. The infection may follow the normal course with numerous trypanosomes in the blood or it may be neurotropic leading to posterior paralysis. In this case the blood usually contains few trypanosomes but an emulsion of the brain may be infective.

JACK (pp. 443-817) has continued his observations of *G. morsitans* in the Zambesi valley where in the hot season the shade temperature may reach 106° F. and where the wild fly may lose water in excess of replacement. In many localities cooler refuges than those afforded by simple shade are essential for *G. morsitans* during the latter half of the dry season and in especially hot periods the fly might suffer a severe setback. In certain kinds of riverine forest however the evaporation rate is much lower than standard meteorological records indicate. The author gives in detail his findings on the fat and water content of flies examined in relation to feeding site and other factors.

In Northern Nigeria *G. morsitans* and *G. tachinoides* annually in March shift their breeding ground from the edge to the centre of a residual forest island—a distance of 40 yards. NASH (p. 554) attributes this move to a negative reaction to light when the flies are exposed to high temperatures.

NASH (p. 234) points out that in Nigeria bats may be an important source of food for *G. tachinoides* and *G. morsitans* when floods force the game away from the tsetse infested river plain.

Pathology Clinical Findings Treatment

HAWKING and GREENFIELD (p. 235) describe the post mortem findings in two cases of *T. rhodesiense* infection in which no effective treatment had been given. In each case there were tuberculous foci in lungs, liver, spleen and glands. Trypanosomes were present in the blood and in effusions found in the pleura, pericardium and peritoneum and there was subacute inflammation of the myocardium and epicardium. The cerebrospinal fluid contained numerous trypanosomes but the changes in the central nervous system were limited to histiocytic infiltration of the cerebral membranes. It is concluded that in the absence of treatment the visceral lesions of *T. rhodesiense* infections are probably more often fatal than the lesions of the nervous system.

VAN ZYL and GEAR (p. 236) describe the course of trypanosomiasis in a European who refused all treatment. The infection was acquired in N. Betsuanaland and proved fatal within six months. It was probably due to *T. rhodesiense*. A brother of this patient was infected at the same time but was apparently cured by a course of Bayer 205.

As a result of work on animals infected with *T. brucei* VAN DEN BRANDEN (p. 237) considers that a complement fixation reaction may

be applied in the diagnosis of human trypanosomiasis or as an estimate of prognosis during the course of treatment. The serum of rabbits gives positive results with an antigen of *T. brucei* if the animals have had the infection for a considerable length of time but the test becomes negative after treatment. There is however the difficulty of obtaining a suitable antigen since the blood of laboratory animals infected with *T. gambiense* is not sufficiently rich in parasites for the purpose.

HAWKING and SMILES (p 238) have used the property of fluorescence possessed by 4,4'-diamidino stilbene to study its distribution in trypanosomes and in the bodies of animals. It is absorbed in large quantities by trypanosomes and is deposited in the blepharoplast and in granules in the cytoplasm. In mice it is found in the liver and kidneys and possibly in the small intestine and skin. It is excreted in the urine (markedly within seven hours ceasing within two days) but probably not in the bile.

MAYER (p 239) discusses the selective action of drugs on definite constituents of trypanosomes for instance the effect of Bayer 205 in preventing division of the cytoplasm in spite of the fact that nucleus and blepharoplast may divide. Finally there may be produced forms without blepharoplast or nucleus. Antimonials act on the nucleus the action of synthalin resembles that of Bayer 205 but Mayer gives evidence to suggest that it acts primarily on the blepharoplast.

As a result of prolonged observation of patients with *T. gambiense* infection treated with Bayer 205 SAUNDERS (p 534) has reached the conclusion that even in advanced cases this treatment may produce remission lasting for many years.

KUNERT (p 818) has shown that Bayer 205 when given in doses of 3 gm intravenously or by the mouth reaches the cerebrospinal fluid but in only $\frac{1}{2}$ to $\frac{1}{3}$ the concentration present in the serum. Treatment of late stages of *T. rhodesiense* infection with Bayer 205 is often unsuccessful even if three doses each of 3 gm are given at five day intervals since although there is a temporary action on the trypanosomes relapse in the cerebrospinal fluid occurs probably owing to the presence of drug resistant trypanosomes. The trypanosomes probably reach the cerebrospinal fluid from the tissue of the choroid plexus.

HUMPHREYS and DONALDSON (p 240) have found that in toxic doses Bayer 205 consistently produces zonal degeneration of the adrenal cortex of small laboratory animals but there is evidence to suggest that healing may take place relatively quickly if the injections are stopped. Spacing of the doses is important. Animals injected on alternate days showed a much greater death rate than those injected at intervals of eight days. It is noted that doses comparable to those used therapeutically in man may produce similar but less intense adrenal cortical lesions in animals.

HAWKING (p 534) has tested the toxicity of Bayer 205 for mice the work cannot be further summarized.

GULTON and YORKE (p 533) note that an atoxyl fast strain of *T. rhodesiense* has preserved its character for 12½ years and that other strains resistant to Bayer 205 or undecane-diamidine have lost part of their resistance after periods up to four years.

SAUNDERS (p 532) has treated 14 cases of sleeping sickness in the Gold Coast with 4,4'-diamidino diphenoxy pentane (pentamidine). He reports that early cases appear to be cured and that untoward effects are trivial.

remained a function of the individual strain and was greatly different in the two strains investigated. Cross immunity tests emphasized the difference between the two strains.

MAZZOTTI and LEON (p. 671) quote evidence to show that *T. cruzi* is a probable vector in part of Ecuador and that the disease is probably endemic there. PIFANO (p. 247) reports that he has found *Amblyomma lonstroium*, a parasite of the porcupine, naturally infected with *T. cruzi*. MAZZOTTI (p. 247) has shown that the Cimicid bug *Haematopsyllus inodorus* can be infected with *T. cruzi* by feeding upon infected mice and that metacyclic forms of the trypanosome can be found in the faeces some 15 days after feeding. At that time the intestinal contents of the bug are infective to mice. WOOD (p. 244) has found *Triatoma* infected with *Trypanosoma cruzi* in five areas of Texas from which infection has not hitherto been reported. Two bugs, *T. longipes* and *T. protracta woodi*, have for the first time been found naturally infected. In these areas the relationship between man and bugs is intimate and the strains of *T. cruzi* are virulent. He advises that unilateral palpebral oedema in man in infected areas should be viewed with suspicion as probable evidence of Chagas's disease.

WOOD (p. 445) gives a list of the *Triatomids* collected in the south western United States. Species found infected with *T. cruzi* were *Triatoma protracta*, *T. protracta woodi*, *T. rubida*, *T. longipes* and *T. gerstaeckeri*. He (p. 671) allowed a number of non-infected Reduviid bugs to feed on his arm with the object of determining what after effects occurred. Late local reaction was produced by one only of the eight species tested. The experiments were undertaken to draw a distinction between the effects of the bites of non-infected and infected bugs since a prevalent symptom of infection is palpebral oedema.

TORRES (p. 672) has found in infected puppies cellular infiltration round the myocardial capillaries and damage to the endothelium. The infiltration is held to be due directly to the capillary damage and is not associated with the presence of trypanosomes; the latter are found agglomerated in tissues between the muscle fibres.

MAZZA *et al.* (p. 446) draw attention to the intermittent fever which is associated with the presence of *T. cruzi* in the blood and point out that a fairly constant feature in some cases is a double peak in the 24 hours. This form of chart is found to coexist with the leishmanial forms of the parasite invading the tissues and brings the disease more into line with kala azar. In comment SCOTT points out that kala azar exists in the Argentine where Mazza's cases were seen and that in such cases it would be well to exclude coexistent kala azar as a cause of the peculiar temperature curve since hitherto the double peak has been regarded as an indication of kala azar.

MAZZA *et al.* (p. 671) record a number of cases of meningo-encephalitis in Chagas's disease. In some instances this complication appeared early in others late but at any time it is serious. The only effective treatment is stated to be the intramuscular injection of Bayer 7602 in doses of 100 m.m. per kilo given repeatedly.

MAZZA and SALICA (p. 248) describe three types of chagoma—(1) Chagoma of inoculation, a swelling at the site of original inoculation; (2) Metastatic chagomata, satellites of the primary chagoma; (3) Haematogenous chagomata, multiple and probably blood borne appearing at a distance. They describe the histology in which inflammation of the skin and cytosteatonecrosis of the subcutaneous tissues are features. Leishmanial forms of *T. cruzi* are demonstrable in the histiocytes.

MAZZA *et al* (p 249) describe a patient with a primary chagoma of the neck and a general erythematous eruption. Leishmanial forms of the trypanosome were found in a biopsy specimen taken from a site where the rash was prominent.

Discussing the diagnosis of Chagas's disease TORREALBA (p 746) states that the value of the Machado reaction is debatable the examination of thick blood films is likely to be positive in early cases only and blood inoculation is not successful. He considers therefore that venodiagnosis is the method of choice and for this purpose he uses *Rhodnius prolixus* or *Eutritoma maculata*.

MAZZA (p 820) gives the history of the drug known as Bayer 7602 which has proved valuable in the treatment of Chagas's disease in the acute stages. Intramuscular injections in doses of 30-120 mgm per kilo body weight are given without rest periods unless albuminuria is produced and it has been found that trypanosomes disappear from the blood. PIFANO (p 245) however notes that although some of the clinical signs of the disease appeared to recede after the fifth dose of Bayer 7602 he has observed like results in patients who received no treatment.

SINJOVICH and SOULAINI (p 246) report apparent cure in one case in which treatment included the use of parovyl (0.02 gm per kilo body weight) and dicalose and arrhenal 0.1 gm daily. Charles Wilcocks

MALARIA

SCHWETZ (J) with the collaboration of H. BAUMANN, Mme BEUMER & M. FORT. Sur le paludisme endémique dans la vallée de la Semliki et sur les rives du Lac Albert [Endemic Malaria in the Semliki Valley and on the Shores of Lake Albert]—*Ann Soc Belge de Med Trop* 1941 Dec 31 Vol 21 No 4 pp 339-373. With 1 map.

Four days spent in the Semliki Valley south east of Beni and 11 days on the shore of Lake Albert in and around Kasenyi enabled the author to obtain blood smears from 1067 natives and his trained entomological assistants to make collections of adult and larval Anopheles in these relatively low lying situations and on adjacent plateaux. The River Semliki here is about 800 metres above sea level. The subsequent examination of this material is the basis of this very detailed preliminary report.

In the Semliki valley the two most common of the Congo malaria vectors *A. gambiae* and *A. funestus* both occur. Endemic malaria was found in all the six villages in the valley that were visited. The endemicity varied a little from place to place but was not intense. Parasites were rarely numerous. *P. vivax* was not found and *P. malariae* frequent in the children was not once found infecting adults. A village on a plateau about 1800 metres high was free from malaria. In and around Kasenyi on the south west shore of Lake Albert *A. gambiae* was rarely found. *A. funestus* and *A. pharoensis* were much

have been published the bibliography contains 23 references also the *Bulletin* 1941 Vol. 38 pp 106 174 175 644. References are given in these abstracts] *Norm*

- 1 HEILIG (Robert) & VISWESWAR. Quinine Diuresis Conditions—*Indian Med Ga* 1942 Sept Vol pp 513-517
- 2 INDIAN MEDICAL GAZETTE 1942 Sept Vol. 77 No 546 With 1 graph—The Kidney in Malaria

1 Heilig & Visweswar describe two cases in which the treatment of quinine was followed by the disappearance of ascites and general anasarca which had failed to respond to the usual diuretic remedies. The first case was that of a boy of 5 years who was admitted to hospital suffering from generalized oedema and a very large ascites. He had suffered from attacks of fever during the previous six months. No malaria parasites were found in the blood but the malaria flocculation test gave a positive result. The Wassermann and Kahn reactions were negative. The scanty urine contained much albumin red blood cells leucocytes and hyaline and granular casts. Two weeks of energetic treatment with the usual diuretics gave no relief the general condition became much worse. Then fifteen grains of quinine a day were given this was later reinforced with a daily intramuscular quinarsol injection. After 16 days of this treatment the ascites and oedema had completely disappeared and the body weight was reduced from 41 to 25½ pounds. The clinical improvement was fully maintained during the four weeks after the cessation of the quinine treatment and a persistent albuminuria was the sole remaining pathological sign.

The second patient a coolie aged 28 was admitted to hospital in a similar waterlogged condition. He too gave a history of recent attacks of malaria but no parasites were found. The malaria flocculation test was positive the Kahn and Wassermann reactions negative. There was only a trace of albumin in the scanty urine. Treatment with urea and ammonium chloride and the elimination of 40 hookworms reduced the weight of the patient by forty pounds and caused the disappearance of the oedema but the large ascites persisted almost unchanged four weeks after admission. Daily intravenous injections of quinine were given for ten days ten grains of quinine a day was also given by mouth. The ascites disappeared completely. There was some reduction in size of the large spleen and the haemoglobin content of the blood increased from 15 to 20 per cent (Sahli) it had been only 23 per cent on admission.

In commenting on their cases the authors state that malarial nephritis reported in the literature has been almost exclusively connected with *P. malariae* infections. In their practice *P. malariae* is very rare and when parasites have been found in such cases they have been *P. vivax*.

2 In a leading article the *Indian Medical Gazette* reviews the literature of malarial nephritis. Regarding the mechanism of production of subacute glomerular nephrosis perhaps the most plausible suggestion is that it is an allergic phenomenon due to previous sensitization of the kidney in susceptible individuals by foreign protein substances derived from parasite and host tissue destruction resulting from the malaria infection and its cure. *Norman White*

WEED (Lewis H) The Critical Antimalarial Problem and Its Solution
—*Jl Amer Med Assoc* 1942 Nov 28 Vol 120 No 13
pp. 1043-1044

The critical problem dealt with is that arising from the facts that the loss of Java deprived the allies of the source of 90 per cent of the world's pre war supply of quinine and that military operations are taking place to a large and increasing extent in countries in which malaria is endemic or hyperendemic. To make the most of the limited stocks of quinine available the National Research Council and the War Production Board of the United States framed the measures which are set out in this paper.

The use of quinine and other cinchona alkaloids is restricted to the treatment of malaria except that quinidine may be used in the treatment of cardiac disorders and quinine may be used in the treatment of myotonia congenita. Persuasive efforts have been made to collect all stocks of quinine in the United States.

More use is to be made of totaquine. Totaquine was recognized officially in the 12th edition of the U S Pharmacopoeia it was considered however that the constitution of totaquine therein described allowed too much latitude. On the advice of the National Research Council the U S Pharmacopoeia has now adopted the following definition. Totaquine is a mixture of alkaloids from the bark of *Cinchona succirubra* Pavon and other suitable species of *Cinchona*. It contains not less than 7 per cent and not more than 12 per cent of anhydrous quinine and a total of not less than 70 per cent and not more than 80 per cent of the anhydrous crystallizable cinchona alkaloids the designation crystallizable alkaloids referring to cinchonidine cinchonine quinidine and quinine. It is recommended that the dose be 10 grains three times a day for seven days.

The production of atabrin is sufficient to supply all anticipated needs. Pharmacological and clinical investigations have shown that a variable percentage of persons receiving atabrin as a clinical prophylactic have temporary gastrointestinal disturbances. The yellow pigmentation of the skin during administration is harmless and not associated with any disturbance in liver function.

The Subcommittee on Tropical Diseases of the National Research Council recommends as an efficient therapy routine

- (1) Combined QAP Treatment (method of choice) —
 - (a) Totaquine or quinine sulphate 10 grains thrice daily after food for 2 or 3 days or till fever is controlled
 - (b) Atabrin 0.1 gm thrice daily after meals for the next five days
 - (c) Two days without antimalaria medication
 - (d) Plasmogaine 0.01 gm thrice daily after meals for five days (twice daily for debilitated patients)
- (2) Atabrin Plasmogaine Treatment —

In simple *P. vivax* infections or when no quinine or totaquine is available atabrin in the above doses may be given for 7 days then two days free from antimalaria medication followed by five days plasmogaine medication as above.

- (3) Totaquine or Quinine Plasmogaine Treatment —

If no atabrin be available give totaquine or quinine as above for seven days during the last five days of which associate each dose of totaquine or quinine with plasmogaine 0.01 gm (thrice daily).

(4) *Suppressive Treatment* —

Atebrin 0.1 gm twice daily after food twice a week. Allow two or three day interval between day of medication.

It is recommended that pending more experience atebrin should only be given under the guidance of a physician or public health officer.

Cinchona barks from South America with a low quinine content but sufficiently rich in total extractable alkaloid, to make totaquine may be available in sufficient quantity to enable totaquine to replace civilian quinine requirements in the U.S.A.

In this communication the only salt of quinine referred to is the sulphate which is soluble in cold water to the extent of 1 in 800 only for use in solution it is necessary to add 1 mm of dilute sulphuric acid for each grain of the salt. Quinine sulphate and quinine hydrochloride are of course much more soluble. For a discussion of modern methods of treatment and prophylaxis of malaria see the Bulletin 1942 Vol 39 p 891.] Norman White

RUSSELL (Paul F.) & MONAHAN (P. Balarama). On the Transmission of *Plasmodium gallinaceum* to Mosquitoes.—*Amer J Trop Med* 1942 Sep Vol 27 No 5 pp 559-63 With 3 fig

In a previous paper this Bulletin 1943 Vol 40 p 17] RUSSELL and MONAHAN reported the experimental infection of 12 species of mosquitoes of the genera *Anopheles* and *Aedes* with *Plasmodium gallinaceum*. In the present paper five more species are added to the list and it is stated that there has never been failure with any species of these genera which have been tested. With species of *Anopheles* and *Culex* results have been very different for there was development of some oocysts in only a few specimens of *Culex quinquefasciatus*. In contrast to the facility with which *Aedes albopictus* and *Anopheles stephensi* fed on all parts of the fowl species of *Culex* and *Anopheles* were reluctant to feed even when feathers had been removed from an area on the back of the fowl. It would appear unlikely that local species of *Culex* and *Anopheles* are natural hosts of *P. gallinaceum* in Madras where the observations were made. C. M. Heron

RUSSELL (Paul F.) & MONAHAN (B. N.). The Immunization of Fowls against Mosquito borne *Plasmodium gallinaceum* by Injections of Serum and of Inactivated Homologous Sporozoites.—*Jl Experim Med* 1942 Nov 1 Vol 76 No 5 pp 477-495 With 1 chart [12 refs]

The authors describe attempts to immunize fowls against *Plasmodium gallinaceum* infections by repeated injections of inactivated sporozoites or of serum from normal or chronically infected fowls. When tested subsequently by feeding infected mosquitoes upon them the groups of fowls which had been treated were found to have some degree of immunity as shown by the reduced death rate and by the lowering of the average maximum percentage of red cells infected during the course of the infection. When fowls were immunized by repeated injections of both vaccine (emulsion of dried thoraces of infected mosquitoes) and serum a higher degree of immunity was attained. As proved by the lowering of the death rate from 55.4 per cent in the controls to 7.3 per cent in the treated fowl. The average highest

percentage of infected red cells in untreated fowls was 30.1 per cent. By the combined methods of immunization this figure was reduced to 1.5 per cent. It has been shown that the injections of normal sheep serum or that of chronically infected fowls will increase the size of the spleen to double its normal volume. It is concluded that the results appear to indicate an interaction of both cellular and humoral agencies in defence against malaria since the greatest immunizing effect was produced by a combination of vaccine and serum injections.

C. M. Wenyon

PURCHASE (Harvey S.) Turkey Malaria — *Parasitology* 1942 Nov
Vol 34 Nos 3/4 pp 278-283

A malarial parasite of turkeys was discovered in a number of birds from different localities in Kenya. The disease induced by artificial inoculation of infective blood is highly fatal to young poults. Schizonts are frequently found in endothelial cells of blood vessels. A prominent feature of the post mortem appearance of birds which have died of the infection is the accumulation of pigment in the spleen, liver and mucous membrane of the duodenal loop. Pigment is present in smaller quantity in the lungs and kidneys. In the chick a transient infection can be produced but ducks and adult fowls seem to be refractory. The author states that he has been able to trace only one reference to malaria in turkeys namely that of PARCIVANIDZE in 1914. It is possible however that MACFIE'S *Halteridium* sp. of the turkey in West Africa (1915) may be identical with the malarial parasite considered in the present paper. A complete description of which is to be given by Dr Carlton HERMAN who studied the parasite when on a visit to Kenya.

C. M. Wenyon

BLACKWATER FEVER

FOY (Henry) ALTMAN (Alfred) BARNES (H. D.) & KONDI (Athena)
Anuria With Special Reference to Renal Failure in Blackwater
Fever, Incompatible Transfusions, and Crush Injuries — *Trans
Roy Soc Trop Med & Hyg* 1943 Jan 30 Vol 36 No 4
pp 197-238 [213 refs]

The purpose of this paper is to examine the present status of the problem of anuria and oliguria occurring in such syndromes as blackwater fever, favism, incompatible transfusion and crush injuries and to suggest that the renal abnormalities occurring in all these diseases have a similar basis. The hypothesis that anuria occurring in the haemoglobinurias of incompatible transfusions, blackwater fever and in rabbits injected with haemoglobin solutions is the result of mechanical blockage of the renal tubules with haemoglobiniferous products especially when the urine is acid is insufficient to account for all the facts and in the light of recent work seems an improbable explanation. The view that oliguria and anuria can be prevented by the simple process of alkalinizing the urine is not borne out in the majority of cases and on physiological grounds seems unlikely.

After briefly summarizing the earlier observations of PLEHN (1903) POYFICK (1883) WERNER (1907) and DE HAAN (1905) and particularly

the work of BARRATT and LORKE (1909) and LORKE and VAUSS (1911) the authors pass to an examination of the alkalization hypothesis of BAKER and DODDS. From their critical survey of all this work they reach the general conclusion that tubular blockage *per se* may not be the cause of the renal symptom and that the blockage is itself determined by antecedent factors of which diminished glomerular filtration due to whatever cause is an important entity since it will lead to inadequate flushing that will facilitate the deposit of material in the lumen of the tubules.

It is considered however that no single explanation can account for the changes in renal function and the anuria which occurs in the intravascular haemolyses but that they are due to a series of events starting off with the sudden haemolysis and leading to the other symptoms which are characteristic of all these conditions. The authors then proceed to consider one by one the following factors which may be involved in reducing renal function:—

- (a) Effects of haemoglobin on renal metabolism
- (b) Haemoglobinaemia in connexion with permeability changes
- (c) Electrolyte and base-water balances
- (d) Osmotic pressure in relation to filtration and reabsorption
- (e) Changes in glomerular filtration and tubular reabsorption
- (f) Urinary pigments in relation to blockage
- (g) Quantitative relation between tubular blockage and renal function
- (h) Protein catabolism in relation to azotemia
- (i) Favism
- (j) Sulphonamide haemoglobinurias
- (k) Crush injuries

It is impossible in a summary of moderate length to deal adequately with this interesting and important paper. For those who are unable to consult the work in detail the following summary given by the authors may suffice:—

1. The azotemia that occurs in blackwater fever, crush injuries, incompatible transfusion, malaria and other intravascular haemolyses has been attributed to blockage of the renal tubules with precipitated products of haemoglobin from an acid urine with a sodium chloride content of more than 1 per cent.

2. In the light of more recent investigation it appears that the azotemia in these conditions is of extrarenal origin and the leucemia and anuria a result of dehydration, diminished blood flow in renal circulation and glomerular filtration. Upsets in the acid base-electrolyte-fer balance appear to be important factors in bringing about these changes. As a result blockage would seem to be a consequence and not a cause of the anuria. In cases where it does occur blockage may well be an additional factor that increases the danger of renal failure. Further rising blood ureas are not necessarily an index of renal breakdown.

3. The alkalization hypothesis is examined and the conclusion drawn that there is insufficient evidence to warrant any statement as to its efficacy in the prevention or relief of leucemia and anuria. It is suggested that dehydration, both actual and physiological, is a much more important factor in determining the onset of oliguria and anuria and that more attention should be given to this aspect of the problem. It is pointed out that dangerous states of alkalemia are often a result from alkalinization although the urine is still acid and that the latter is not a sound index on which to base treatment. It is also pointed out that anuria is no commoner in acid than in alkaline patients in blackwater fever, in spite of the greater haemolyses that sometimes take place in

the former. In the case of blackwater fever it should be borne in mind when assessing the value of any particular form of treatment that 60 to 80 per cent of the cases recover anyway and many in the complete absence of any form of treatment.

4. A number of recent workers have pointed out that the excretion of solids is more efficient in acid than in alkaline urine and that the kidneys themselves retain less iron and/or pigment which may be regarded as an index of the overloading of the tubular epithelium and of cast formation.

5. Consistent reports show that dehydration is the most constant feature in many of the syndromes discussed above and that tubular degeneration precedes blockage in the majority of cases.

6. Some experimenters have concluded that blockage was the main factor in the development of the azotemia because they failed to take into account acid base electrolyte water balance disturbances which in many cases were actually produced by the conditions of their experiments and by the administration of large doses of citrates bicarbonates and ammonium chlorides.

7. The significance of hypochloraemia and hyponatraemia is dealt with in relation to the problem of azotemia and dehydration together with its effects on other electrolytes and the acid base water balance glomerular filtration tubular reabsorption and urine concentration. Many workers seemed to have solved this knotty aspect of the problem to their own satisfaction by considering only one electrolyte but the complexity of this subject becomes very evident when ionic balances are viewed as a whole which they obviously must be.

8. It is suggested that no single explanation can satisfactorily account for the changes that take place in renal function in the conditions described and that they are probably due to a series of events started off by acute haemolysis.

9. Whether haemoglobin is a toxic substance *per se* is difficult to decide in the present state of our knowledge. Many workers have reported toxic effects from injections but have failed to take into account other complicating factors. Some have stated that if the haemoglobin is stroma free no toxic effects develop others have denied this and by experiments have proved that neither haemoglobin nor stroma has any serious effects when injected. Others have shown that similar effects can be produced by the injection of small amounts of distilled water.

10. In regard to incompatible transfusion there appear to be two types of reaction. (a) an immediate and profound reaction following the injection of very small quantities of frankly incompatible Landsteiner groups which is generally fatal. (b) a less serious and somewhat delayed reaction produced by the lysis of much larger quantities of blood producing haemoglobinaemia methaemalbuminaemia and haemoglobinuria and due apparently to the presence of Rh factors and other little known subgroups. The situation in these two conditions is compared with that in blackwater fever and the other intravascular haemolyses. Products of antigen antibody reaction cannot be ruled out in these conditions.

11. It is pointed out that haemoglobin metabolism in man dogs cats and rabbits etc. is not comparable and that results of haemoglobin injection experiments into the lower animals and even into baboons should not be lightly referred to man. Further the interpretation of *in vitro* experiments are not always applicable *in vivo* where haemoglobin is concerned. Methaemalbumin is found in all the intravascular haemolyses of sufficient magnitude in the primates and can be produced *in vitro* by the incubation of a primate plasma haemoglobin system provided the pH rises above 8.0. Since such a pH is never attained *in vivo* it seems that the *in vitro* and *in vivo* formations are not similar. This pigment is never found in urine and there appears to be no quantitative relation between methaemalbumin in the plasma and methaemoglobin in the urine.

12. There is evidence from a variety of sources to show that haemoglobin is reabsorbed by the tubular epithelium of the kidneys and

that this in some measure accounts for the discrepancies between the amounts of haemoglobin found in the urine and that liberated by the destruction of the erythrocytes. The onset and extent of the haemoglobinuria also appears to be dependent upon the rate and capacity of the epithelial cells to take up haemoglobin from the filtrate that passes down the tubules as well as on haemoglobin formation.

13 The problem of the passage of large size molecules like haemoglobin (M.W. 17 000 x 4) through the glomerulus is discussed in the light of SVENBERG, MONKE and LUNDS and KEYS work. It is suggested that several factors may be operative in this little understood phenomenon. The haemoglobin (Hb4 M.W. 68 000) molecule may dissociate into submultiples (Hb4 Hb3 Hb1) which would permit its passage through the glomerulus (SVENBERG) in the same manner as Bence-Jones protein (M.W. 30 000) normally passes without doing injury to the glomerulus. Alternatively the glomerulus may possess a small proportion of pores that are large enough to permit the passage of the undissociated molecule of haemoglobin. Finally some authors suggest that changes in permeability may be a factor.

14 In addition to the molecular weight and radius as factors in their passage through membranes, ionic charges and isoelectric points are undoubtedly important in controlling the passage of some molecules while retaining others. The question of permeability in general is discussed in relation to blackwater fever and the other intra-vascular haemolyses.

15 Changes in colloid osmotic equilibria of the plasma are examined in relation to glomerular filtration in blackwater fever. Insufficient data are available on this important aspect to draw any satisfactory conclusions. It has been shown that in blackwater fever the serum proteins are normal, in spite of the additional amount thrown into the plasma by the haemolysed red cells, so that in this condition colloid osmotic changes do not appear to play a part in the onset of oliguria.

16 The tubular changes are examined and compared in blackwater fever, crush injuries, incompatible transfusions, post uraemic states and after histamine and hypertonic sucrose injection and the problem of tubular reabsorption is considered in respect of the changes that take place. Tubular changes seem to be a fairly constant accompaniment of dehydration and electrolyte acid base disturbances and will have an important effect on urine formation and concentration as well as on the back diffusion of urea. Excess unselective reabsorption of the tubular filtrate by damaged epithelium has been suggested by some authors as a more important cause of oliguria than tubular blockage. Reduction in glomerular filtration and occlusion of glomeruli may also be a factor in tubular degeneration. H-substances as well as the injection of histamine have been shown to bring about tubular degeneration.

17 Many workers have described inclusion in the cells of the renal tubules and recent investigators have suggested that the taking up of protein material may lead to degeneration. A further fact of importance is that in most of the conditions described there is diminished renal blood flow due to a variety of causes and since the oxygen consumption of the tubules is so much greater than that of the glomeruli it is likely that they would be more seriously affected by renal ischaemia.

18 Visible glomerular changes do not appear to have been described in the conditions discussed although more subtle changes cannot be ruled out. In the anaemia due to blockage of the ureters with crystalline products of sulphamides glomerular changes have however been noted, no doubt due to back pressure as well as other factors. Some authors have described bloodless glomerular tufts in cases of incompatible transfusions and in experimental animals. It is probable that variations in renal blood flow are much more important in controlling glomerular filtration than are blood pressure changes. Variations in the number of functioning glomeruli in the mammal, although denied by some, may be a factor.

in urine formation. It has been suggested that dehydration may bring this about as it does in the frog here again dehydration appears to be the key to the situation.

19 The quantitative aspects of tubular blockage are next dealt with and the relation of this to oliguria, anuria and azotemia. Very few authors give any idea of the extent of the blockage in the cases that they examine and confine themselves to general statements. It would appear that the extent of the blockage is in the majority of cases insufficient to account for the oliguria or anuria especially when it is remembered that the kidney works with a reserve of some 80 per cent.

20 Very little information is available concerning the relative proportions of haemoglobin and necrosed cells in the blocked tubules nor does there appear to be much correlation between the degree of haemoglobinuria and/or blockage and anuria. In crush injuries and incompatible Landsteiner transfusion the amount of haemoglobin in the plasma and urine is minimal yet oliguria, anuria and azotemia sometimes develop.

21 The problem of urinary pigments especially methaemoglobin is dealt with and the suggestion made that mere changes in pH and sodium chloride concentration are not the only factors at work in determining the amount and type of pigments present in the urine. Studies in crush injuries indicate that the pigment in the urine is met myohaemoglobin with a molecular weight of 17 500. Methaemoglobin has not been described in spite of the presence of oxyhaemoglobin and low pH.

22 A brief account is given of the haemolyses that sometimes occur after sulphonamides and in favism and the suggestion is made that these probably fall into the same category as the other intravascular haemolyses.

H. Jorke

TRYPANOSOMIASIS

VAN HOOFF (L.) HENRARD (C.) & PEEL (E.) Recherches sur le comportement du *Trypanosoma gambiense* chez le porc [The Behaviour of *T. gambiense* in the Pig]—*Rec Trav. Sci. Med. Congo Belge* Leopoldville 1942 Jan No 1 pp 53-68

Certain observations made at the Leopoldville laboratory have led to the conclusion that the indigenous pig may be an ideal reservoir of the trypanosomes pathogenic for man [thus *Bulletin* 1938 Vol 35 p 330]. Although they are very rare in the blood trypanosomes readily infect *Glossina*. The infected pig remains asymptomatic for prolonged periods. After three cyclical passages through the pig *T. gambiense* preserves its pathogenicity for man.

Full details of this work which has been going on for more than two years are given in the present paper. The following is the summary.—

1 A strain of *T. gambiense* remains pathogenic for man after 3 and after 10 cyclical passages in pigs.

2 The index of transmissibility of this trypanosome was at first exalted during its initial cyclical passages through the pig but later gradually decreased. The introduction of another vertebrate host exalted it. The attenuation is attributed to the persistence of the trypanosome in a single species of animal and to the benign character of the affection produced.

3 During the evolution of the infection in the pig the cyclical transmissibility of the trypanosome gradually became attenuated.

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4 *T. gambiense* produces an asymptomatic affection in the pi which evolves towards spontaneous cure. Reinfection is possible even with the same strain. In the course of reinfection the transmissibility is conserved in certain cases but on the whole it is diminished and sometimes it is lost. Reinfection produces an infection which is shorter and more discrete. It may even be impossible owing to the immunization of the animal. There is no immunity against heterologous strains such as *T. brucei*.

The first infection manifests itself most frequently by the appearance of trypanosomes in the blood during a variable period, but this period may be entirely absent, and in such cases the presence of the parasite can only be discovered by haemoculture or by xenodiagnosis. The animal is nevertheless infectious during the second period the parasite sites are no longer discoverable by direct observation but the animal remains infectious for a period which may be at least a year.

5 In the course of successful cyclical passages through 10 pigs one strain of *T. gambiense* has not shown any notable change in respect of morphology or of chemo-resistance. W. J. Ork

VAN HOOFF (L.) HENFARD (C.) & PEEL (E.) Irregularities de la transmission du *Trypanosoma gambiense* par *G. palpalis* [Irregularities in the Transmission of *T. gambiense* by *G. palpalis*]—*Revue de Parasitologie et de Med. Comp.* 1942. 16 refs. No 1 pp 69-80. Leopoldville. 1942. Ja

Previous work by these authors has shown that although a single bite from an infective Glossina actually infects the gumeapi, it fails to do so in about 77 per cent. of cases (this Bulletin 1938 Vol. 30 p. 335). Various hypotheses have been advanced to explain this phenomenon: (1) a transient refractory state on the part of the gumeapi; (2) a loss of virulence of the trypanosome for the vertebrate; and (3) a diminution in the infective power of Glossina because the salivary glands have been freed from parasites possibly because the salivary trypanosomes have been affected by some anatomical imperfection in the biting apparatus and salivary tract and possibly because the salivary trypanosomes in the course of their development pass through phases in which they cease to be pathogenic. In the present paper the authors have examined the problem in considerable detail and as the result of their investigations with isolated infected Glossina they have reached the following conclusions:—

In a strain of *T. gambiense* taken well on the gumeapi, each bite causes infection.

In another strain less well adapted there are failures. These failures increase when the Glossina are fed on animals which have been treated by Germanin even when the interval between the administration of the drug and the infection is very long, surpassing the average duration of an enfeebled capacity of trypanosomes to infect Glossina.

Evidence of the prolongation of the incubation period. This was extended to 86 days for the last bite of an isolated fly on the 103rd day of the life of this fly.

A record is given of the history of a Glossina which, after having infected an animal was completely cleared of all flagellates.

The influence of feeding infective flies on fowls appeared to be very doubtful

Anatomical malformations of the salivary or biting apparatus of *Glossina* were not observed by the authors

Observation of guineapigs subjected to the bites of isolated infective *Glossina* indicates without doubt a transient refractory state in certain of the vertebrate receptors. But it is possible to find other explanations of which an important one is a delay in the completion of the cycle of the parasite in the fly. This very plausible hypothesis however cannot explain all the failures

Finally the capacity of the trypanosomes to infect the guineapig can be altered or even suppressed. It was totally suppressed in a strain of *T. gambiense* which had sojourned for almost 10 years in the same patient. This prolonged sojourn or possibly the various treatments which the patient received must have produced this modification. In other strains of *gambiense* coming from a patient infected for a long time or from one in whom the disease developed very slowly the same change although in a less degree was observed and could not be explained as the result of drug treatment. The loss of virulence for the guineapig of the salivary trypanosomes in flies infected from the pig which shows few signs of disease is very marked

W Yorke

BURTT (E) Observations on the High Proportion of Polymorphic Trypanosome Infections found in the Salivary Glands of *Glossina brevipalpis* near Amani Tanganyika Territory with a Note on the Appearance of the Infected Glands—*Ann Trop Med & Parasit* 1942 Dec 31 Vol 36 No 4 pp 170-176 [13 refs]

From April to December 1937 Burtt was engaged in investigating the ability of *G. brevipalpis* to transmit *T. rhodesiense*. Concurrently with these transmission experiments numbers of *G. brevipalpis* were dissected and their salivary glands examined. The preliminary dissections were found to yield such an unusually high proportion of positive results that this aspect of the matter was further investigated. The results are recorded in the present paper. In all 12 550 male *G. brevipalpis* were dissected and 105 (0.84 per cent) were found to have salivary gland infections. Details are given of the localities studied in the present investigation and the results are recorded in tables

The following is the summary —

1 A total of 12 550 *Glossina brevipalpis* were dissected from three localities near Amani Tanganyika Territory and 105 flies were found with salivary gland infections. The results from the three localities were as follows: (a) at Sigi 2 217 flies were dissected of which 0.32 per cent were infected; (b) at Old Road 3 008 flies were dissected of which 0.73 per cent were infected; (c) at Masherwa 7 325 flies were dissected of which 1.04 per cent were infected.

2 The infected salivary glands in *G. brevipalpis* appeared chalky white by reflected light and could be recognized with the naked eye.

3 A large proportion of the infected salivary glands in *G. brevipalpis* appeared Vandyke brown or black when viewed under the lower power of the microscope. These seemed to be old infections. Others lacked this dark appearance and were probably young stages of the infection in the gland.

4 Most of the salivary gland infections in *G. brevipalpis* were extraordinarily heavy. This conforms with the findings of Bruce *et al* in Nyasaland. Only three light infections were observed.

5 Of the 10 flies with infected salivary glands 43 also had trypanosome colonies in the abdomen.

6 Marked fluctuation in the proportion of flies with infected salivary glands occurred over short periods ranging from 1 to 18 days. The percentage of infected flies varied from 0 to 58% consecutive flies examined to 4.94 in a batch of 81 flies. Very large samples therefore need to be examined before a representative picture is obtained for any locality.

7 No relationship was noted between the mean monthly maximum temperature recorded at Sigi and the proportion of flies with infected salivary glands which occurred there although the greatest proportion was observed in the locality with the lowest altitude and therefore with the warmest general climate.

H. York

LOURIE (E. M.) Treatment of Sleeping Sickness in Sierra Leone —
Ann Trop Med & Parasit 1942 Sept 30 Vol 36 No 3
pp 113-131 [20 refs]

In this paper the author records the results obtained by him in the treatment of *gambiense* sleeping sickness by the aromatic diamidines. The work was carried out in the Freetown district of Sierra Leone from September 1939 to July 1941. The outbreak was apparently of four to five year duration and in parts of the area the infection rate was as high as 20 to 30 per cent. The patients were treated in the course of control of the outbreak by mass diagnosis and mass treatment by mobile teams in the field. The great majority of the patients were treated by the well-established remedies antrypol and tryparsamide but opportunity was also taken to test certain of the aromatic diamidines. Among the 3197 patients dealt with 95 per cent were in fair condition but the remainder showed evidence of serious affliction, i.e. gross somnolence, dementia, severe pituitary thyroid derangement, inability to walk without support, etc. The mortality among untreated cases was estimated to be as high as 300 to 350 per 1000 per annum. The patients belonged mainly to the Kissi tribe and were very poor and undernourished. Their diet consisted of little else than rice and they were regularly subject to a severe hungry season during the months preceding the annual rice harvest. The hungry season of 1940 was particularly serious amounting practically to a period of true famine. Lourie states that these factors probably predisposed to the severe toxic effects of treatment by antrypol and tryparsamide—toxic effects which were more severe than those reported elsewhere.

Twelve different treatment courses were employed. The drugs were usually given intravenously but occasionally intramuscularly. They were dissolved in freshly distilled water. The average weight of adult patients was about 118 lb for males and 105 lb for females. Children were given fractional doses on a basis of full adult doses per 100 lb of body weight. The treatment courses were as follows:—

A. Antrypol 1150 mg and tryparsamide 1000 mg

- (i) Antrypol 5 doses of 1 gm at five-day intervals
- (ii) Tryparsamide 10 doses of 1 gm at five-day intervals

Combined courses of antrypol and tryparsamide

- (iii) Antrypol 3 doses of 1 gm followed by tryparsamide 5 doses of 2 gm at five-day intervals
- (iv) Antrypol 3 doses of 1 gm followed by tryparsamide 7 doses of 2 gm following a rest interval between the first two doses then five-day intervals

- (v) Antrypol 2 doses of 1 gm followed by tryparsamide 6 doses of 2 gm at five-day intervals
- (vi) Antrypol 1 dose of 1 gm followed by tryparsamide 9 doses of 2 gm at five day intervals

Aromatic diamidines

- (vii) Stilbamidine * 8 doses of 50 or 75 mgm usually daily but sometimes at five-day intervals
- (viii) Pentamidine * 8 doses of 50 or 75 mgm usually daily but sometimes at five-day intervals
- (ix) Pentamidine 10 doses of 100 mgm at five day intervals
- (x) Pentamidine 12 doses of 100 mgm daily
- (xi) Pentamidine 3 doses of 50 mgm followed by tryparsamide 5 doses of 2 gm at five day intervals
- (xii) Propamidine * 8 doses of 50 or 75 mgm usually daily but sometimes at five-day intervals

Lourie deals in some detail with the toxic effects of treatment. Immediate reactions to antrypol and tryparsamide were usually quite inconspicuous but a number of complaints were very apt to arise a few days after injection. These were more or less in order of frequency —

After antrypol headache and generalized body pains fever cough or bronchitis diarrhoea stomatitis gingivitis or sore throat papular rashes localized oedema generally of legs or face but sometimes in other sites such as arms or scrotum peeling of skin generalized or especially around the mouth blepharitis or conjunctivitis jaundice itching of skin

After tryparsamide visual disturbances such as dimness or blurring of vision headache and body pains cough diarrhoea fever peeling of skin papular or maculo papular rashes itching sore throat lachrymation oedemas

After three doses of antrypol followed by tryparsamide severe body pains and headache fever diarrhoea stomatitis or gingivitis and occasionally herpes peeling of skin usually branny but often exfoliative oedemas cough visual disturbances papular or maculo papular rashes blepharitis or conjunctivitis sometimes suppurative vomiting itching jaundice

The general similarity of these symptoms suggests that they are for the most part not referable to any essential toxicity of either drug in the absence of some common underlying unfavourable factors such as those mentioned above but it is noteworthy that they did not arise among patients treated by the diamidines. The toxic effects occurred in about 20 per cent of 148 cases treated by five antrypol doses with no tryparsamide and in about 10 per cent of 485 cases treated by 10 tryparsamide doses with no antrypol. They were usually mild but were sufficiently serious to require treatment to be interrupted in each group in about 3 to 5 per cent of cases with less than 1 per cent of deaths during treatment or within a month of its termination. In the combined treatment of course in (three injections of antrypol followed by five of tryparsamide with five-day intervals between all doses) the incidence of toxic complications among the 1466 patients was considerably higher i.e. 35 per cent including 15 per cent serious with a mortality of as much as about 5 per cent during treatment or within a month of its termination.

The names stilbamidine pentamidine and propamidine have been given recently to 4,4-diamidino stilbene 4,4-diamidino diphenoxy pentane and 4,4-diamidino diphenoxy propane respectively.

In course v (two doses of antrypol followed by six of tryparsamide with five-day intervals between all doses) the incidence and severity of toxic effects seemed to be only slightly less. Considerably fewer and milder toxic reactions were however encountered in course iv consisting of three doses of antrypol followed by seven of tryparsamide with five or seven weeks between the first two doses and then five-day interval, and in course vi consisting of one dose of antrypol followed by nine of tryparsamide with five-day intervals between all doses. The fact that course vi should have been so much less toxic than course iii is particularly striking in view of the fact that it involved the injection of nearly twice as much tryparsamide. After considering his observations on this matter Lounie reaches the conclusion that where there was an interval of five days between all injections a course of three antrypol followed by tryparsamide was associated with very severe toxicity. He believes that a preliminary dose of antrypol five to seven weeks previously is able whether by improving the condition of the patient or in some other way to mitigate the toxic effects of later courses of antrypol followed by tryparsamide at five-day intervals.

A table shows the relationship of cerebrospinal fluid cell count at the start of treatment to incidence of serious visual disturbance after treatment. The incidence of serious visual complication after tryparsamide varies from less than 0.5 per cent to nearly 6 per cent according to the initial cell count.

Turning to the diamidines Lounie found that the outstanding feature of the immediate reaction is the sudden and usually severe but transient fall in blood pressure. Associated with this there may be a number of subjective and objective disturbances. With the sudden drop of blood pressure there was a rapid thin or unperceptible pulse, sweating, dizziness, faintness or loss of consciousness, sometimes with epileptiform twitching and on rare occasion, incontinence of faeces and urine. Salivation with nausea was common and sometimes vomiting. There was also often a curious, puffiness or suffusion of the face and eyelids. Within 10 minutes to half an hour the patients recovered from these disturbances apparently completely in all cases. No late toxic effect, visual or other, were observed after the administration of the diamidines.

The next portion of the report deals with the effects of treatment. These are summarized in a series of tables. The following are the conclusions—

1. Conclusions are drawn upon the effects of the treatment of T. g. by sleeping sickness among people of a particularly poor and undernourished type in Sierra Leone from September 1939 to July 1941. Treatment was mainly by antrypol and tryparsamide but the opportunity was also taken to make a trial of three aromatic diamidines—pentamidine, proflumidine and stilbamidine.

Toxicity

2. Treatment by antrypol (1-gm. doses) and tryparsamide (2 gm. doses) was frequently followed by severe toxic effects. These arose in cases treated by either drug alone but were of particularly high incidence and severity in a combined course of 3 antrypol doses followed by 9 tryparsamide injections being at five-day intervals. Such a combined course was more severely toxic than a regimen of only 1 antrypol followed by 9 tryparsamide doses at five-day intervals in spite of the fact that the latter course involved the injection of nearly twice as much tryparsamide. There is some evidence to suggest that the toxic effects of a combined

course of several antrypol followed by tryparsamide injections at five day intervals may to some extent be mitigated by the preliminary injection of a dose of antrypol 5-7 weeks before the beginning of the course

3 After treatment by tryparsamide or by antrypol followed by tryparsamide the incidence of serious visual disturbances varied from less than 0.5 per cent of 318 cases in whom there had been 0-4 cells per c mm in the cerebrospinal fluid at the start of treatment to nearly 6 per cent of 102 cases in whom the initial count had been over 100 per c mm

4 Injections of the aromatic diamidines usually produced severe and often alarming immediate reactions associated with a pronounced fall in blood pressure but passing within half an hour. There were no later toxic effects comparable with those encountered after antrypol and tryparsamide and in fact no late toxic result of any nature visual or other. It is a distinct advantage of these compounds over antrypol and tryparsamide that they may be given in daily injections—the most intensive course employed was of 100 mgm pentamidine daily for 12 days and this was given to 80 cases. However reference is made to the reports of other workers which indicate that in heavier dosages than were practicable for the Sierra Leone cases the aromatic diamidines are not without potentiality of producing late toxic disturbances of a serious nature

Therapeutic Value

5 Figures are given showing the proportion of cases in which 5-6 weeks and 4-5 months respectively after the start of treatment by different types of course there was a change in the cerebrospinal fluid cell count of the following order

(a) An increase to more than 10 where the count at the start of treatment had been 0-4 per c mm or to more than double the initial count where this had been above 4 per c mm

(b) A decrease to less than the square root of the count at the start of treatment where this had been above 20 per c mm

It is of course not suggested that such an increase or decrease in the cell count after treatment is in any individual case necessarily of great prognostic significance but in sufficiently large groups treated by different means valuable inferences are to be obtained by comparing the relative numbers of cases in which these changes have occurred

6 The changes in cerebrospinal fluid cell counts together with the results of a clinical follow up investigation 12-20 months after treatment warrant the conclusions that

(a) In early cases the curative properties of pentamidine and of propamidine are no less than those of tryparsamide (the latter drug given either alone or preceded by injections of antrypol). Stilbamidine is of considerably less value

(b) In late cases tryparsamide is much more effective than the three diamidines named

II York

FAIN (Alexandre) Accidents toxiques et résultats après une seule injection de Bayer 205 administrée préventivement dans un ancien foyer de trypanosomiase [The Toxic Effects and the Results of a Single Injection of Bayer 205 Administered as a Preventative in an Old Focus of Trypanosomiasis]—*Rec Trav. Sci. Méd. Congo Belge* Leopoldville 1942 Jan No 1 pp 137-144

The observations described in this paper were made among the population living on the Congo between the Kasai river and Stanley Pool. The population numbered about 4500 individuals almost all of whom received an injection. The focus of sleeping sickness was very old but still active during 1939 162 new cases (3.69 per cent of the total population) were discovered

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The drug employed was Belganyl Meurice. It was given in a dose of 0.025 gm per kilo dissolved in six times its weight of distilled water. The German preparation Bayer 203 was administered to 20 patients with the object of comparing its toxic effect with that of Belganyl. No difference was discovered. The toxic effects were noted and have been grouped as follows —

Toxic effects occur immediately or very early. In many patients a condition of presyncopal nausea was noted within a few minutes of the injection. It was very transient. In about a dozen cases this was accompanied by marked shock and vomiting. At the beginning of the crisis there was often transient congestion of the face and some of the whole body. A fatal issue was observed in a woman of 45 years who received only 1 gm of Belganyl. She exhibited in a marked degree the symptoms described and some moments before death the sphincters were relaxed with the passage of urine and faeces. It is interesting to note that all subjects except one in whom the circulatory shock was intense were adult women. Another sign observed immediately after injection was a cutaneous eruption. Often within an hour there appeared large or small papules. Sometimes there was itching of the skin and there was usually a rise of temperature.

Toxic effects appear some hours after the injection or on the following day. These were —

- (1) Papular eruptions which might or might not itch.
- (2) Two to three hours after the injection a large number of patients had a febrile disturbance usually short but often serious. In many cases the temperature was over 40°C.
- (3) Intense photophobia with lachrymation was observed the day after the injection.
- (4) Palpebral oedema as seen in one patient the day following the injection.
- (5) Intense abdominal distension accompanied by constipation as seen in a baby of five months.
- (6) The majority of the individuals injected exhibited a cutaneous hyperaesthesia which as very marked and localized in the extremities of the limbs. This phenomenon appeared the day after or the day but one after the injection causing difficulty in walking and preventing manual work. This was due to localized hyperaesthesia of the soles of the feet and palms of the hands.

Toxic effects appear some days after the injection. The chief of these was albuminuria. Examination of the urine of 46 patients who had received 1.5 gm of Belganyl and of Bayer 203 showed that the toxic action of the albuminuria reached 2 gm and microscopic examination of the urine revealed casts and red cells.

Toxic effects about a week after injection. Towards the end of the first week a number of patients showed a cutaneous desquamation localized in the extremities of the limbs. The author made some observations on the results of prophylactic administration of Belganyl after a nine months interval. It was intended to give four injections at three-monthly intervals during the year 1940 but for various reasons the May and August injections were not given. There was thus a period of nine months between the first injection given in February and the second at the end of November. After the injection in February 1940 the population was visited three times in May, August and November. On each occasion every

individual was carefully examined from the point of view of trypanosomiasis. Details are given of twelve new cases discovered in the course of these three visits. All these patients had received the preventive injection of Belganyl in February 1940. It is interesting to note that only three of these 12 patients had trypanosomes in the blood or glands and also that a large proportion of them were in an advanced stage with grave clinical symptoms and a profoundly changed cerebrospinal fluid. The general conclusion drawn from this work is that the wholesale administration of Belganyl is not without dangers. The toxic effects are not negligible but the real advantages resulting from the procedure in a heavily infected district largely compensate for its defects.

W. Yorke

IRIARTE (David R.) Xenodiagnostico y reaccion de Machado Guerreiro en la enfermedad de Chagas [Xenodiagnosis and the Machado Guerreiro Reaction in Chagas's Disease]—*Bol. Laboratorio Clinica Luis R.elli*. Caracas 1941 Aug. Vol 2 No 5 pp 102-107.

This is a very iconoclastic paper. The author dilates upon the difficulties of carrying out the xenodiagnostic test unless all laboratory facilities and a good insectarium are available. In hospital and general survey work the difficulties are almost insuperable and judging from his personal experience he has not been very successful. He has carried out the test on 35 patients using larvae and nymphs of *Rhodnius prolixus* and *Lutritoma maculata* the former for 24 and the latter for 11. Of the patients 27 were males, 8 females, twelve were under 20 years of age, thirteen between 20 and 30, seven between 30 and 40 and three between 40 and 50. They came from thirteen States. 4 were whites, 5 natives and 26 were half-castes. They presented one or more symptoms of Chagas's disease—fever, splenomegaly, hepatomegaly, cardiac lesions or irregularities, adenopathy, nervous disturbances, anaemia, etc. All were negative to the xenodiagnostic test.

Twenty-eight were subjected to the Machado Guerreiro reaction. Two were positive, one strongly, one weakly, and a third was doubtful. The author concludes: The Machado Guerreiro reaction is losing ground. It is not a specific reaction but a group one and is given also by leishmanial conditions which are common in this country.

H. Harold Scott

LEISHMANIASIS

PELLÉZ REDONDO (Julio) Die Hämatologie der Kala Azar der Erwachsenen. Diagnostische Bedeutung der Sternalpunktion [Haematology of Adult Kala Azar. Diagnostic Value of Sternal Puncture]—*Wien. Klin. Woch.* 1942 July 24 Vol 55 No 30 pp 585-588. With 1 fig. [32 refs.]

The author, who has been studying kala azar in Spain, calls attention to the fact that since the civil war cases have become increasingly common in adults. There does not seem to be any satisfactory explanation of this increase in the adult incidence but it must in some way be connected with the breakdown in the sanitary system as a

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result of the war. A similar increase in adult cases has been reported in recent years from other Mediterranean countries. A number of such cases were studied by the author in Salamanca. He has found that spleen puncture is the surest method of discovering leishmania while in no case has he been able to demonstrate leishmania in the blood. In 16 of a series of 17 cases there was a marked leucopenia. The one exception was in a case of only a week's duration. The relative lymphocytosis though there was no change in the absolute number of lymphocytes. The granulocytes present in the blood are largely immature forms with 4 per cent myelocytes and 8 per cent unsegmented forms. In many cases the eosinophiles are diminished. There is an increase in the monocytes and plasma cells. In all cases a marked thrombocytopenia existed. The bone marrow showed changes corresponding with the altered blood picture as shown in the myelograms from four of the cases which are reproduced in the paper. The author concludes that the cases studied indicate that the bone marrow has been influenced by the changes occurring in the spleen as well as by the toxic action of the parasites leading to an increased passage of cells into the peripheral blood.

C. W. HENYON

BARBER (H. J.) SLACK (R.) & WIEB (R.) Increase in Toxicity of Stilbamidine Solution on Exposure to Light. [Correspondence]—*Nature* 1943 Jan 23 Vol 151 No 3871 pp 107-108

MIRA in a private communication to the reviewer suggested that solutions of stilbamidine which had been kept for some time increased in toxicity and that this fact explained a number of deaths which had occurred after the use of this drug in the treatment of leishmaniasis in the Sudan. FELLER and YORKE (this Bulletin 1943 Vol 40 p 23) had estimated the point and found that solutions of stilbamidine which had been exposed to light increased considerably in toxicity for mice whereas solutions which had been kept in the dark remained unchanged. The present work has confirmed and extended these observations. It was found that dilute solutions of stilbamidine (0.5 per cent) exposed to sunlight increased in toxicity four to five fold in about four days after which there was no appreciable further increase. Weak solutions changed much more rapidly than did stronger solutions but by subjecting 10 per cent solutions to the light from a mercury arc lamp for several hours the authors have been able to prepare sufficient quantities of toxic solution for isolation of the material responsible for this toxicity. It is believed that the toxic product is almost certainly 4,4-diamidino phenyl benzyl carbinol but rigorous proof is difficult. It is probable that the reaction of water to the double bond of the stilbene linkage follows from this and from the fact that other therapeutic diamidines have shown no such alteration in biological or chemical properties that the change is associated solely with the unsaturated stilbene linkage and that the amidine groups are not affected. The symptoms produced in mice by the toxic substance were more stimulant in character than those caused by freshly prepared solutions of stilbamidine which were mainly depressive. In general the pharmacological effects shown by the toxic product differed quantitatively from those of the original substance. The

depressor action in the anaesthetized cat was increased about five times and recovery was delayed. Atropine only partially antagonized this effect while the spleen was actively contracted. Smooth muscle of the rabbit intestine was sometimes contracted in concentrations of about 1 in 50 000 but after atropine inhibition and relaxation were always produced thus differed from the effect of stilbamidine which caused contractions which were only lightly reduced after atropine. The fall of pressure was probably mainly due to vasodilatation since there was no depressant action on the isolated rabbit's heart. The isolated product had a toxicity in mice which was five times greater on intravenous injection and 10 times greater on subcutaneous injection than that of stilbamidine. It is important to note that the toxic product was almost inactive therapeutically against *T. equiperdum*.

W. Jorke

KIRK (R) Some New British Synthetic Drugs in the Chemotherapy of Protozoal Infections—*East African Med J* 1942 Oct Vol 19 No 7 pp 219-223 [24 refs.]

In this note Kirk briefly summarizes results obtained in the clinical trial of the aromatic diamidines in trypanosomiasis, leishmaniasis and babesiasis. All this work has already been summarized in this *Bulletin*.

W. Jorke

SILVERBERG (Mabel G.) & HENSCHEL (Egbert J.) Oriental Sore in the United States. Report of a Case—*Arch. Dermat. & Syph.* 1942 Nov Vol 46 No 5 pp 705-710 With 3 figs.

The case reported is that of a man 48 years of age who developed oriental sore in the form of lesions on the forehead, ear and wrist a few months after returning to the U.S.A. from a visit to Greece. Leishmania were demonstrated in the lesions which disappeared after 41 intravenous injections of a 1 per cent solution of tartar emetic.

C. M. Henyon

GELBER (A.) Oriental Sore Possibly Contracted in the United States. Report of a Case—*Arch. Dermat. & Syph.* 1942 Nov Vol 46 No 5 pp 739-740

A woman 53 years of age, a native of California, noticed a small red papule on the middle of the left cheek 12 years after a visit to Italy. The lesion increased in size and was finally removed by surgical diathermy. It is stated that examination of the infiltration with the Gram stain shows the presence of leishmanin bodies (*Leishmania tropica*). It is concluded that if the patient became infected during the European tour, an incubation period of 13 years must be admitted. On the other hand, if infection did not then take place, it must have occurred in the U.S.A. probably from contact with natives from the Near East. [The evidence that the parasite was actually *Leishmania tropica* seems inconclusive as Gram staining is not the usual method for demonstrating this organism.]

C. M. Henyon

ROW (R) & KULFARNI (S S) The Role of Methaemoglobin on the Leptomonad Phase of *Leishmania tropica* with Special Reference to its Reversion into Leishmania Forms in Culture —*Indian Med Gaz* 1942 Sept Vol 77 No 9 pp 536-537 With 6 figs on 1 plate

In a former publication [this *Bulletin* 1923 Vol 20 p 103] Row showed that in old cultures of *Leishmania tropica* there appeared rounded leishmania forms of the parasite which he styled O bodies. To the presence of these forms he attributed the infectivity to mice of old cultures even to the extent of producing generalized infections as in kala azar. Studying the production of the leishmania forms in old cultures the authors have found that their appearance coincides with the transformation of the oxyhaemoglobin of the medium into methaemoglobin. To test the influence of methaemoglobin on the flagellate forms the following procedure was adopted. The liquid of an old culture in which the change had occurred was centrifuged and the brown supernatant fluid separated. Into this fluid containing methaemoglobin actively multiplying flagellates from a young culture were inoculated. Active multiplication with rosette formation continued but after about a week's growth increasing numbers of leishmania forms began to appear. A study of mears shows that the leishmania forms are the result of a shortening of the flagellate forms in the rosette with finally a retraction of the flagella. C M Henson

AVERA (Herald) Treatment of Oriental Sore —a Review of Recent Literature —*Jl Trop Med & Hyg* 1941 Aug 15 Vol 45 N 18 pp 1-124 [39 refs]

FEVERS OF THE TYPHUS GROUP

BIRAUD (Yves) La menace actuelle du typhus exanthématique en Europe et les possibilités d'y parer —Reprinted from *Bull de l'Organisation d'Hygiène de la Société des Nations* 1942 Vol 10 Extrait No 1 80 pp With 1 chart & 1 map [Bibliography]

— The Present Menace of Typhus Fever in Europe and the Means of combating it —*Bull Health Organisation* (League of Nations) 1943 Vol 10 No 1 pp 1-64 With 1 chart & 1 map [Bibliography]

This valuable Bulletin on louse borne typhus in Europe deals with the existing epidemiological conditions the possibility of an extension of the disease and the steps that can be taken for its control by disinfection and the use of vaccines.

The devastation that can be caused by typhus is shown by the experience of Eastern and South Eastern Europe during and after the war of 1914-18.

TARAS EVICH estimated that 25 million cases occurred in Russia in the years 1917 to 1918 not including the millions of unapparent attacks in children and partly immune adults. The remarkable freedom of the Western Front in 1914-18 is attributed to absence of the virus from the civil population.

In the discussion of recent events the author holds that the reason why the campaign in Poland was not immediately followed by an epidemic was that it occurred in September the month in which infection is at its lowest ebb. In the six months ending June 1940 however there were nearly 4 000 cases in the Warsaw district against only 33 in the corresponding period of the previous year. The disease has been increasing in the same way all over Poland and in the Balkan countries. Even more ominous is the experience in Germany where there were no cases in the civil population in 1939 6 in 1940 395 in 1941 and 1 732 in the first half of 1942. No further figures are being published in Germany and there is no information about the incidence of the disease among troops or prisoners of war in the Reich or occupied countries. Infection has been widespread in Germany it has presumably been introduced by prisoners and by soldiers returning from the eastern front. No official information is available from Soviet Russia but although conditions in Russia are specially suitable for the occurrence of outbreaks the Russian troops have a great advantage over the German in being partly immunized by previous attacks.

Spain was surprisingly free from typhus during the civil war but there have been many post war epidemics in various parts of the country. In the first three months of 1942 there were 3 604 cases nearly half of them in Madrid and Barcelona.

Typhus is endemic in all the countries of North Africa epidemics are closely associated with periods of economic distress. In Morocco Blanc's vaccine is said to have controlled the disease but in Algeria and Tunisia the cases in 1941 were more than double those recorded in any of the previous twenty years and in 1942 were even more numerous.

[In *Public Health Reports* Washington the cases from January to September 1942 are shown as follows: Morocco 25 666 Algeria 34 913 Tunisia 16 152 and Egypt 22 653. These figures do not bear out the statement that the disease has been brought under control by vaccines in Morocco.] French observers hold that many of the cases are old infections which have remained dormant and have been lighted up by malnutrition.

Isolated cases have been occurring in France among new arrivals from North Africa and also in domiciled labourers originally from the same region. The disease has spread only in the prisons of Marseilles in which more than 100 cases have occurred.

If the war is prolonged so as to cause widespread economic distress a great epidemic can only be prevented by the strict control of louse infestation in the civil and military population. Among the precautionary measures are the education of medical personnel especially in early diagnosis the isolation of patients the provision of stocks of vaccine and of an organization for collecting convalescent serum or for preparing hyperimmune animal serum.

The section on vaccines is of special interest about two thirds of the text is devoted to the subject. A clear and succinct account is given of every important type of vaccine and information is given about some recent developments which have not yet been published.

The great advantage of killed vaccines is their complete safety but the maximum degree of immunity takes three weeks to a month to develop three injections are needed protection lasts only for about one year and is to some degree specific for the strain of *Rickettsia* from

which the vaccine is prepared. Living vaccines are all prepared from murine strains of *Rickettsiae* but they give an earlier and higher degree of protection and that with a single injection. On the other hand many workers fear that the introduction of a living virus may give rise to an infection which is capable of being transmitted by lice and a certain number of accidents some of them fatal have followed their use. Recently efforts have been made to titrate their virulence so as to avoid the use on the one hand of ineffective and on the other of dangerous strains.

Of the killed vaccines Weigl's has largely fallen into disuse. In Weigl's laboratory each dose costs about three Swiss francs.

Cox's vaccine made from *R. prowazekii* cultivated in the yolk sacs of chick embryos is being made in large quantities in the U.S.A. and used for the protection of American troops as well as for export to England and other countries. It has also been adopted by the German army and is being made in China and South Africa. Three doses are given at intervals of seven to ten days followed by single doses every four to six months. Conclusive evidence of its efficacy in field conditions is not yet available.

Killed vaccines made from the livers of mice and other rodents inoculated by the nasal route are being prepared in Paris, Algeria, Zurich, Tunis, Bucharest and Germany. Citka has just reported good results in Rumania. Most of the laboratory workers engaged in its preparation get attacks of the disease. In Zurich Mooser uses the murine strain of *Rickettsiae*; elsewhere the classical strain is used.

The egg yolk and rodent lung vaccines give equal protection to animals but their comparative efficacy in the field is not yet known.

Living vaccines are always made from the murine strain of the virus. Both of the original methods of preparation by BLANC and LAIGRET have been superseded because of incidents that arose during their large-scale application in North Africa.

Blanc now uses a vaccine made from the bile treated faeces of fleas infected by feeding on white rats inoculated with the virus. The vaccine is supplied in the dry condition. It keeps well and can be used by any physician.

LAIGRET and DURAND now make a living vaccine from the brains of mice inoculated by the intraperitoneal route. The dose is titrated by finding the amount needed to cause paralysis in mice. From one mouse's brain a thousand doses can be prepared. Claims are made by their authors that these new living vaccines are quite safe but there has been a general reluctance on the part of other workers to use a living virus whose later behaviour in the human body cannot be predicted.

The preventive measures against typhus can be summed up as disinfection which if properly carried out gives complete protection to any community and vaccination by one or other method according to circumstances. In limited outbreaks in a stable and non-infested population killed vaccines are recommended; in widespread epidemics living vaccines must be used because they alone can give prompt protection and the risks involved are far less than those of the disease.

[This Bulletin is invaluable to all those who are interested in the prevention of louse-borne typhus. The author has discussed frankly and fully the limitations of prevention by vaccines but it may be well to warn the uninitiated that disinfection is the only method that has been proved to be completely effective. The personnel engaged in

prevention must be inoculated and even more important must be youthful troops going to infected places must also be inoculated but disinfection whenever practicable is just as essential as ever Vaccination should be regarded as a subsidiary method of control though in exceptional circumstances it may be the only practicable measure Cox's is the only vaccine likely to be available]

John W D Megan

CIUCA *et al* Contributions to the Study of the Virulence of *Rickettsia prowazeki*—*Bul d l Sect Scient d l Acad Roumaine* 1941 Vol 24 No 3

The following is a translation of a German abstract of the paper dealt with —

A *Rickettsia* strain was obtained from inoculation of guinea-pigs with blood of typhus patients and then enriched by intra anal instillation of brain emulsion from the guinea-pig into the louse gut This strain showed an exceptional virulence for human beings which was retained even after 24 passages The risk of infection in the laboratory for persons handling it was 100 per cent The disease attacked the body by way of the mucous membrane or quite insignificant skin lesions Persons who had not previously been inoculated against it suffered the severest attacks of the disease Those who had been inoculated 7 years before had the disease in only a moderate degree A person who had been inoculated with Weigl's vaccine 7 months previously showed a certain degree of immunity A favourable result shortening of duration of illness was obtained in one case by prophylaxis with convalescent serum This was given in the first three incubation days in large doses This shows the necessity for laboratory work to be carried out only by persons who have already been repeatedly protected by inoculation

W P Kennedy

STURM (Alexander) Das Fleckfieber und seine Bedeutung für die klinische Pathologie des Stammhirns [The Significance of the Clinical Pathology of the Brain-Stem in Typhus Fever]—*Klin Woch* 1942 Oct 10 Vol 21 No 41 pp 899-904 [54 refs]

The greater part of this lengthy paper consists of an erudite discussion of the close association that exists between the clinical manifestations of typhus fever and lesions of the brain stem The vasomotor disturbances such as tachycardia and low blood pressure which are often followed in the later stages by bradycardia and high blood pressure are attributed to damage of the vasomotor centres of the mid brain Bronchopneumonia gastro intestinal disturbances hypocalcaemia hypochloraemia deviation to the left of the leucocyte index nephritis polyuria hyperthyroidism insomnia motor disturbances etc are all believed to result from a destructive proliferative thrombo-angitis which interferes with the blood supply of the various centres of the brain stem especially those of the hypothalamus

The author's personal experience of the differential diagnostic features in the early stages of the disease are interesting Special stress is laid on the following points—(1) The rapid or even sudden onset simulating influenza with fever pains in the head and limbs (2) pronounced insomnia (3) a strikingly dry often leathery tongue

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such as is not seen in the early stages of other infections (though the author states that other observers have described the tongue as being frequently moist) (4) a specially pronounced deviation to the left of the polymorphonuclear index (5) a moderate acceleration of the sedimentation rate of the erythrocytes in contrast with the great reduction that occurs in central pneumonia and (6) an early positive diazo reaction is often seen.

The rash is not a reliable guide—it was typical in only 10 of the author's cases but the total number is not stated. In 3 cases it was completely absent though one of these was fatal and another severe. The Weil-Felix reaction may give equivocal results—sometimes the titre was only 1:30 on the 10th day in severe cases and titres of 1:100 occurred in some cases that were not typhus. At the same time the great value of the test in diagnosis is fully recognized.

John H. D. Macfarlane

WENSCHE, Neurological Contribution to the Clinical Picture of Typhus
—*Deut. Med. Woch.* 1942 Oct 2 Vol 68 No 40 p 884

The diagnosis of typhus can be facilitated in the early stages by neurological signs. The first indication is sudden high rise in temperature accompanied by a quite typical and unusually stubborn headache which responds only slightly to analgesics. An additional sign is hardness of hearing which occurs in almost all cases. If these signs are accompanied by speech disorders and the characteristic twitching of the perioral muscles the diagnosis of typhus exanthematicus is assured even without a distinct exanthem.

Therapy consists in relieving the pressure. Apathy or restlessness respond quickly to lumbar puncture. Circulation and respiration definitely improve and the distressing headache disappears. Along with the essential care which must be paid to the cardio-vascular system the main therapeutic concern is the prompt reduction of increasing pressure in the cerebrospinal fluid. For this reason strophantidin should always be given in strongly concentrated glucose solutions which exert a dehydrating action. After damage to the vasomotor and respiratory centres the next most important danger is the occurrence of bulbar paralysis. Recovery from the other nervous symptoms which may appear is usual and they do not endanger life.

H. P. Kennedy

LEON (Alberto P.) Precipitation de sueros anti tifo por la orina de enfermos de tifo exantematico. Una nueva reaccion serologica para el diagnostico del tifo. [The Precipitation of Anti Typhus Serum by the Urine of Typhus Patients. A New Serological Test for Typhus Fever.]—*Rev. Inst. Salubridad y Enfermedades Tropicales* Mexico 1942 Sept Vol 3 No 3 pp 201-208

Two tests are described. One is new and the other is a modification of the colloidal fixation reaction of K. Goodner (1941) [reference incomplete]. The new test is called the precipitation reaction. The patient's urine is poured into a narrow test tube to this is added very slowly to prevent mixing an equal quantity of a mixture consisting of one part of anti-typhus serum and four parts of an 8.5 per cent solution of sodium chloride. A positive result is shown by the appearance within one or two hours of a disk of precipitation at the junction of the two fluids. Normal urine is used as a control. Of 29 tests made

on typhus patients 13 gave positive and 16 negative results. Urine diluted 1-10 was also tried with thus the positives appear to have been five and the negatives 12.

In the Goodner fixation test urine in various dilutions is added to diluted anti typhus serum freshly mixed with a solution of mucina granular (Type 1701 W of the Wilson Laboratory Chicago). After thorough shaking the mixture is kept for an hour or two at room temperature and for 12 hours in a refrigerator. The tubes are centrifuged for five minutes at 500 to 1 000 revolutions a minute and then gently shaken. The reaction is read in terms of + to +++ of agglutination. With single specimens of urine of typhus patients the positives are said to be 63 per cent with 24-hour specimens 80 per cent. This reaction is likely to appeal only to research workers who must consult the original paper for details of the technique.

The claim is made that in some cases the diagnosis can be made earlier than by the Weil Felix test but the precipitation test was carried out in only two cases before the fifth day and one of these gave a negative result. The fixation test was positive in four cases and negative in one before the fifth day but the technique is rather complicated and anti typhus serum human or rabbit cannot be regarded as a standardized reagent.

John W D Megaw

TRAUTMANN Frühzeitige objektive Prognosenstellung bei Typhus exanthematicus mit Hilfe des Weltmannschen Koagulations bandes (Early Objective Prognosis in Exanthematic Typhus by Weltmann's Coagulation Test).—*Dent Med Hoch* 1942 Oct 23 Vol 68 No 43 pp 1053-1055 With 3 figs.

Weltmann's little known coagulation test (WSK) as modified by TEUFFEL is based on the observation that varying quantities of 0.5 per cent solution of calcium chloride have to be added to 5 cc of 1 in 50 dilutions of patients' sera in distilled water before coagulation of albumin occurs on boiling the mixture.

The calcium chloride solution is added to the diluted serum in a test tube two drops at a time the mixture is shaken and boiled after each addition and the reading is recorded in terms of the number of additions that have to be made before coagulation occurs on boiling. If only two drops are needed the result is stated as WSK=10 if four drops as WSK=9 if six drops as WSK=8 and so on till 20 drops indicate WSK=1. With normal blood the reading is WSK 6½.

In 73 cases of typhus fever tested before the 15th day the following results were observed.—WSK=7 in 16 cases all of which were mild WSK=6 in 25 cases of which 13 were mild and 12 moderately severe WSK=5 or less in 33 cases all of which were severe. In all the eight cases with readings of WSK=3 or less death occurred.

The chart shows no significant differences in the titres recorded at varying stages of the fever but the index is said to rise to normal in convalescence and a decided fall is regarded as indicating a bad prognosis.

It is claimed that the test gives a clear indication of the prognosis even in the first few days of the disease and that it is decidedly helpful in differential diagnosis.

[This test has been used as an index of prognosis in pulmonary tuberculosis see *Bulletin of Hygiene* 1942 Vol 17 p 764.]

John W D Megaw

LYDIN. Experiences with Typhus.—*Munch Med Woch* 1943
Jan 1 Vol. 90 No 1 p 1

The following is a translation of a German abstract of the paper dealt with —

Early diagnosis of typhus is difficult and the laboratory reactions are unreliable in the early stages, although they will give 90 per cent positive values in a later stage. The most certain early sign is splenic enlargement. Weil-Felix values below a titre of 1:200 prove nothing. The author does not advise energetic measures to support the circulation except when the patients must be transported long distances. Sulphonamid and atabrin plasmoquin treatment were quite valuable and in neither case was there any reduction of mortality. Encouraging results were obtained by the use of convalescent serum in early cases and a definite reduction in mortality was obtained, but in the later stages the serum was inactive. The disease took the mildest course in vaccinated persons. W. P. Kerckh.

SMITH (Felix) & EVAN (R. Winston). Murine Typhus in British Soldiers in West Africa.—*Lancet* 1943 Jan 30 pp 142-143

Four cases of endemic murine typhus in British soldiers are reported from a West African Colony in which the disease has not hitherto been recorded. The clinical features and the Weil-Felix reactions point clearly to a fever of the typhus group but there is no mention of the epidemiological and laboratory findings on which the diagnosis of murine typhus has been based. Three of the patients came not only from the same billet but actually from the same bed each case moving into the infected bed as the previous occupant left it to be admitted to hospital. The dates of onset of these three cases are not stated and there is no reference to a search for insect or rat infestation. The other patient who was the first to be attacked, could not well have been more severely ill and survived.

The titres of the agglutination reactions were as follow —

Case	Date of disease	Proteus OX19	Proteus OX2	Proteus OXK
1	12	63	63	250
	24	128	840	250
	41	128	840	315
2	8	315	125	12
	13	128	125	41
3	9	125	50	50
	17	128	31	415
4	9	6	50	50
	15	125	125	250
	24	128	315	315

In 11 control cases of other diseases malaria bacillary dysentery undulant fever etc (all in persons who had previously been inoculated with T A B vaccine) the following maximum titres were observed —

Titre	Nil	25	50	125	250	315	415
<i>Proteus</i> OX19	1	1	8	1	—	—	—
<i>Proteus</i> OX2	—	—	5	4	2	—	—
<i>Proteus</i> OXA	—	1	2	2	3	2	1

John H D Megaw

SORDELLI (A) MANZULLO (A) RIESEL (M A) & FERRARI (J) *Tifus exantemático I La infección experimental de animales de labora- torio con la sangre de enfermos de tifus exantemático de Bs Aires Córdoba y Santa Fe [Experimental Infection of Laboratory Animals with the Blood of Typhus Patients from Buenos Aires Córdoba and Santa Fe]—Rev Inst Bacteriológ Dr Carlos G Malbran Buenos Aires 1942 Dec Vol 11 No 2 pp 192-209 [10 refs]*

The experiments described in this paper were carried out for the purpose of isolating Rickettsiae from 13 patients suffering from clinical typhus fever. The disease was assumed to be of the murine type though the report does not deal with its clinical or epidemiological features. Sixteen guinea-pigs and one rat were inoculated by the intraperitoneal route each animal received 3 to 4 cc blood. Three to 12 passages were made in each case through guinea-pigs full doses of brain spleen and suprarenal substance were inoculated when available scrapings from the tunica vaginalis were also used. Serotal reactions occurred in only six of the 86 guinea-pigs used but never in the first two passages in one strain the positive reaction did not occur till the 11th passage. The febrile reactions lasted only one two or at most three days and even when serotal reactions were seen the guinea-pigs of the preceding or subsequent passages often had inapparent infections. Rickettsiae were found in smears from the tunica scrapings of only two of the animals that had serotal reactions. In the case in which a primary inoculation was made in a rat the response was slight a serotal reaction occurred in the rat of the third passage and Rickettsiae were found in the scrapings. Inoculations into a series of rabbits with blood from the same patient gave negative results throughout. Blood corpuscles freed from serum by washing and centrifuging the citrated blood were used in some cases rats and guinea-pigs sensitized by irradiation with X rays or by daily intraperitoneal inoculations with normal guinea-pig serum were often employed yet altogether it was possible to isolate Rickettsiae from only 6 of the 13 patients. Three of the positive results were in the nine patients in whom positive Weil Felix reactions indicated the development of antibodies the other three were in four patients whose reactions were still negative.

Even the sensitized rats were little affected in health by the inoculations and none of them died. In spite of the use of scrapings rich in Rickettsiae when these were available it was never possible to establish a strain which gave regular febrile and orchitic reactions.

Although these results were much like those observed in certain laboratory strains of the historic virus the authors disclaim any intention of denying that the virus was of the murine type.

The authors' disclaimer may possibly refer to the type of the disease rather than to that of the virus which certainly was far from being typically murine. Although the authors admit that the conditions were not ideal for the investigation this was much more thorough than is usually possible in cases of this kind. An epidemiological enquiry might yield interesting results.
John H. D. Meek

ANGSTEIN (Ludvik) & BADER (Madero N.) New Epidemiological Aspect of Spotted Fever in the Gulf Coast of Texas.—*Science* 1942, Oct 16 Vol 96 No 2494 pp 357-358

Referring to a recent outbreak of spotted fever in Texas from which strains of the infective agent were isolated and produced in guinea-pigs, immunity to a Montana strain of Rocky Mountain spotted fever but not to louse- or flea-borne strains of typhus Rickettsiae the authors point out that the only tick found in a search of the locality in which the outbreak occurred was *Amblyomma americanum*. This tick is known to be an efficient carrier of the spotted fever Rickettsiae under experimental conditions (see this *Bulletin* 1933 Vol 30 p 899) but has not been proved a vector in nature. Members of the genus *Amblyomma* however are known vectors in Brazil; the present experience suggests strongly that *A. americanum* is a vector in Texas. If this is so the Texas disease would resemble epidemiologically that of Brazil rather than that of the Rocky Mountains.
C. H.

TRAVASSOS (J.) & VALLEJO (A.) Comportamento de alguns caviões (*Cavia aperea* e *Hydrochertis capybara*) as inoculações experimentais do vírus da febre maculosa. Possibilidade desses caviões representarem o papel de depositários transitórios do vírus na natureza. [The Response of Certain Cavidae (*Cavia aperea* and *Hydrochertis capybara*) to Experimental Inoculation with the Virus of Spotted Fever. The Possibility that these Cavidae may be Natural Reservoirs of Infection].—*Me 1st Bulletin* 1941 Vol. 15 pp 73-86 With 3 graphs 15 refs. English summary.

The cavi locally known as preá and the capybara are common in the rural areas of São Paulo in which tick-borne spotted fever is prevalent. The authors have now proved that both of these rodents are susceptible to experimental inoculation with the Rickettsiae of the disease. The cavi reacts in the same way as the guinea-pig; the capybara is less severely attacked but harbours infection in a fully virulent form for at least eleven days.

Captured animals were used in the experiments and only small numbers were available. Some of the caviés and capybaras were found to be immune presumably because of previous natural attacks of the disease. None of the captured animals was found to be harbouring the virus.

Ticks are believed to be lasting reservoirs of infection which is known to be transmitted to their offspring; the rodents act as temporary reservoirs they probably cause periodical increases in the virulence of the Rickettsiae and dissemination of the infected ticks. The severity

of the human disease is greatest in the places in which the rodents are most numerous presumably because of the opportunities for rapid transmission of infection from animal to animal

John W D Megaw

TRAVASSOS (J) & VALLEJO (A) Possibilidade de *Amblyomma cajennense* se infectar em *Hydrochoerus capybara* experimentalmente inoculado com o vírus da febre maculosa [Transmission of Infection by *Amblyomma cajennense* from *Hydrochoerus capybara* Experimentally Infected with the Virus of Spotted Fever]—*Mem Inst Butantan* 1941 Vol 15 pp 87-90 With 1 graph English summary (3 lines)

The authors have transmitted a laboratory strain of the Rickettsiae of spotted fever from an experimentally inoculated capybara to a guinea pig by the bites of laboratory bred ticks (*Amblyomma cajennense*)

Two ticks from a clean batch were allowed to feed on an infected capybara but were not left on long enough to become fully engorged they were kept for six days at laboratory temperature and then were fed for four days on a healthy guinea pig which in due course developed fever On the tenth day of the attack the animal was killed and was found to have typical lesions including great enlargement of the spleen Rickettsiae were isolated from the guinea pig It was concluded that the capybara is one of the animal reservoirs of the tick borne spotted fever of Sao Paulo

John W D Megaw

WERNER (H) Zur Diagnose des Fünftagesfiebers [The Diagnosis of Five Day Fever (Trench Fever)]—*Deut Med Woch* 1942 Sept 18 Vol 68 No 38 pp 934-935

This is a discussion in general terms of the possibilities of laboratory diagnosis of trench fever which has again come into prominence as a war disease The suggestions are based entirely on what was known of the disease before the outbreak of the present war and on analogy with recent work on the Rickettsiae of the fevers of the typhus group

One suggestion is to allow clean laboratory bred lice to feed on the patients during the febrile attacks and to examine the insects four or five days later Abundant growth of Rickettsiae will be found in infected lice The method of examination is not stated The Rickettsiae will be seen in the lumen of the gut or round the epithelial cells not inside the cells as is the case in typhus fever The lice are applied in special cages and it must be remembered that they become infective for man after the fourth or fifth day

Successful cultivation of the Rickettsiae in the testicles of rabbits has been carried out by OGATA who has also transmitted the virus through rabbits by repeated transfers the rabbits of the early passages give no apparent response but in the later passages the testicles yield an abundant growth of Rickettsiae

LEDINGHAM and ARKWRIGHT in the 1914-18 war used suspensions of the Rickettsiae from the guts of infected lice for agglutination tests which appear to have given specific responses Cultures in the yolk sacs of developing chick embryos may possibly be suitable but these are not yet available The author surprisingly refers to OTTO and GILDEMEISTER in connexion with the use of yolk sac cultures of Rickettsiae for protective inoculation against typhus and does not mention the name of COX

John W D Megaw

SMITH (D J W) Studies in the Epidemiology of Q Fever 10 The Transmission of Q Fever by the Tick *Ixodes holocyclus* (with Notes on Tick Paralysis in Bandicoots) — *Australian Jl Experim Biol & Med Sci* 1942 Sept Vol 20 Pt 3 pp 213-217

The scrub-tick *Ixodes holocyclus* is the tick that most commonly attacks man in Australia it has now been shown to be a potential vector of Q fever. An adult *I. holocyclus* previously infected experimentally in the nymph stage by feeding on an infected bandicoot transmitted the disease to another bandicoot on which it fed.

Nineteen male and 29 female ticks were fed on an infected bandicoot of these nine females became infected in the rest no Rickettsiae could be detected. The Rickettsiae were passed from larval ticks to nymphs and from nymphs to adults but not to any of the numerous progeny of three infected ticks.

No infection was found in 109 nymphal and adult ticks collected from 28 bandicoots trapped in the coastal district north of Brisbane and inoculated into 23 guineapigs. 111 larval ticks were also uninfected. An experiment mentioned by the author suggests that bandicoots soon cease to be infective to ticks. 25 nymphs removed from a bandicoot from which a strain of *Rickettsia burneti* was isolated failed to infect a guineapig into which they were inoculated in this case the bandicoot was still infected while the ticks were feeding on it but was no longer infective to them.

The author considers that the tick may transmit infection to man in two ways either by infecting domestic animals from which persons become infected or directly by its bite.

John W D Me ar

YELLOW FEVER

BUSTAMANTE (Miguel E) Distribución geográfica de la fiebre amarilla en México de 1800 a 1923 [The Geographical Distribution of Yellow Fever in Mexico between 1800 and 1923] — *Rev Inst Salubridad y Enfermedades Trop Mexico* 1942 June Vol 3 No 2 pp 93-105 With 1 map English summary

The last case of clinically typical yellow fever in Mexico was reported in January 1923 but protection tests show that cases had occurred at least till 1925. In the last epidemic of 1919-23 the States of Tamaulipas, Veracruz and Yucatán on the coast of the Gulf of Mexico and Sinaloa and Jalisco on the Pacific coast were attacked epidemically, in other States Tabasco, Campeche and Quintana Roo on the Gulf of Mexico and Sonora, Colima and Oaxaca on the Pacific coast reported sporadic cases. For example Veracruz had 598 cases 343 deaths, Yucatán 72 cases 30 deaths, Sinaloa 107 cases 71 deaths, whereas Campeche had 2 cases, one fatal, Quintana Roo 3 all fatal, Colima 7 cases 4 death, Oaxaca 3 all fatal. [The second table setting forth some of these points contains several errors.] It is thought therefore that the jungle form exists in these areas of sporadic cases. Drs HUMM of the Rockefeller Foundation, HERRERA of Guatemala and BUSTAMANTE of Mexico took 807 samples of blood from persons in the Usamacinta Valley from Petén, Guatemala to Chiapas and Tabasco, Mexico in April and May 1942 and sent them to the Yellow Fever

Laboratory New York. The results of examination of these will be recorded later. This area was selected because it has been a silent region while epidemics were raging elsewhere in the neighbourhood. A list of outbreaks of yellow fever in Mexico between 1800 and 1923 is given and a map showing 127 places where these outbreaks took place.

H Harold Scott

FINDLAY (G M) The Action of Certain Surface-Acting Substances on Yellow Fever Virus (Neurotropic Strain). Preliminary Observations—*Trans Roy Soc Trop Med & Hyg* 1943 Jan 30 Vol 36 No 4 pp 247-252

Attempts to produce immunity with yellow fever virus inactivated by heat, ultra violet light or formaldehyde have been unsuccessful. The present work was undertaken to find out if certain surface acting substances would inactivate the virus and yet permit it to retain its antigenic properties.

The brains of mice infected with this virus were ground up in serum saline (1 in 10) to make a 20 per cent suspension. This suspension was then mixed with an equal quantity of the substance to be tested for its power of inactivation. The final concentrations of each compound in the mixed suspension were 0.1, 0.2, 0.4, 1.0 and 2.0 per cent and the pH was adjusted to 7.0-7.2 by means of phosphate buffer. The mixtures were kept at 37°C for two hours and then injected intraperitoneally into mice which immediately before had received intracerebrally 0.03 cc of a 2 per cent suspension of starch in saline. In all 37 substances were tested and the results are given in tabular form.

A large number of agents were found capable of inactivating the virus, but their chemical constitution revealed no general law by which it was possible to determine whether a substance would cause inactivation. Sodium oleate, linoleic and linolenic acids were all active inhibitors, thus bringing their action on yellow fever virus into line with that on various other viruses such as Rous sarcoma, vaccinia, influenza A etc.

The number of substances which allowed the persistence of some degree of the antigenic properties of the virus was much smaller than that which had produced inactivation and included acetyl salicylic acid, linoleic, linolenic, maleic and mucic acids and tetralene.

Virus treated with these substances induced immunity in a proportion of the mice.

E Hindle

PLAGUE

MOLL (Aristides A) & O'LEARY (Shirley) Plague in the Americas XII The West Indies and Certain European African Islands—*Bol Oficina Sanitaria Panamericana* 1942 Oct Vol 21 No 10 pp 980-1000 With 2 maps & 1 chart [Refs in footnotes]

In this study the survey of plague in the Americas has been transferred from the Mainland to the West Indian Islands. The history of

plague in these islands might suggest an immunity or resistance of tropical islands to plague were it not for the similar immunity enjoyed by other non-tropical regions in America and for the persistence of the disease in similarly-situated islands in other parts of the world. The West Indian islands dealt with are Barbados, Cuba, Grenada, Jamaica, Porto Rico and the Virgin Islands. Some discussion is also devoted to the Azores, Canary and Cape Verde Islands of the European and African zones. Neither Barbados nor Jamaica has reported human plague and although Jamaica was visited in 1912 by a ship with plague rats on board this was discovered and the fumigation adopted seems to have prevented an invasion of the island. [The discovery of the plague-infected rats was made by Dr. (now Sir Harold) Scott (late Director of the Bureau of Hygiene and Tropical Diseases) who took steps to prevent the sailing of the ship a few hours before he was due to leave.] The dates of record of plague for the islands were—Cuba 1912, Grenada 1912, Puerto Rico 1912, Trinidad 1907, Virgin Islands 1908, Azores 1908, Canary Islands 1906 and the Cape Verde Islands 1921. Much the same antiplague measures were adopted as in other places.

W. F. Harvey

DEVIGNAT (R). La ration des milieux liquides de culture par barbotage d'air. Aeration of Liquid Media.]—*Proc. Travaux Sci. Méd. Congo Belge*, Leopoldville 1942, Jan. No. 1, pp. 145-160. With 1 fig. and 1 chart. [Summary appears also in *Bulletin of Hygiene*.]

The principle of continuous aeration of the incubating culture is the same as that of the aquarium tank. It may in fact be very conveniently accomplished by means of an electromagnetic pump. The author has worked out in very complete detail a method which makes use of comparatively simple apparatus to bubble air continuously through the culture. This air is washed by passing through an alkaline solution which disengages it of its content of carbonic acid and so prevents acidification of the medium. A clear line-drawing with lettering gives all the detail that is necessary to understand the setting up of the apparatus. The method is not new and the author found that it had already been used by TOPLEY and WILSON for the very purpose of restoring the oxygen necessary for bacterial growth to culture media after autoclaving. Otherwise air could only return to the inoculated medium in the incubator by the slow method of absorption and diffusion. The increase of growth obtained in the aerated over the non-aerated culture varies somewhat for different organisms. In bouillon of pH 6.7 to 7 after 48 hours incubation it was three to five times as great for the plague bacillus, 14 times for the typhoid bacillus and eight times for the anthrax bacillus. In bouillon of pH 7.5 it was found that the growth after 48 hours was 10 times, 9 times and 15 times greater than the control for paratyphoid A, Shiga and typhoid bacilli respectively. While *B. bacillus melitensis* grew 20 times more abundantly in three days. Another great advantage of the continuous aeration by bubbles of air was that the culture suspension remain uniform without formation of clumps or chains which renders them extremely useful for agglutination reactions. The author considers that the prime factor in increasing the growth is oxygenation and not the mechanical aeration of the culture.

W. F. Harvey

DEVIGNAT (R) & SCHOETTER (M) Le bacille de Yersin en milieu aéré
[The Plague Bacillus in Aerated Medium]—*Rec Trav. Sci*
Méd Congo Belge Léopoldville 1942 Jan No 1 pp 161-181

A special study of the effects of continuous aeration during incubation on the plague bacillus has been made by the authors. In the first place it was shown that this elaboration of the technique of culture did not entail any greater risk of contamination. Other points investigated had reference to changes in morphology, the agglutinability of aerated cultures and most important of all the rapid loss of virulence of a strain brought about by aeration. Morphological changes of size were observed in the aerated cultures and there was a great tendency for the bacilli to remain isolated. The main change however observed in those organisms on their way to loss of virulence by aeration was vacuolation. Aeration will serve to prepare agglutinable suspensions of the plague bacillus but their agglutinability is inferior to that of the suspension of an agar culture in normal salt solution.

It was found in the course of experimentation that after several passages in aerated medium at 37 C two highly virulent local strains had lost their virulence after 30 to 36 days of this treatment. The rapidity of attainment of this result may be contrasted with that for the well known E V strain which incubated at 16-20 C required subculture monthly for five years to deprive it of its virulence. The Javan strain Tjwidej on the other hand became avirulent in six months. In the latter case the principle of dissociation was adopted with selection of avirulent colonies.

Great importance is attached to the preservation of antigenic power by avirulent strains. The two characters do not necessarily go together. It was found by the authors that their strains which they had rendered avirulent by aeration preserved a high degree of antigenic power—one which was quite comparable in the guinea pig with the well established antigenic potency of the E V vaccine. H F Harey

FINCKE (I) & JANSSENS (P G) Etude expérimentale comparée d'immunisation antipesteuse par germes vivants atténués et par la lympho de Haffkine [Experimental Study of the Relative Merits of Anti Plague Immunization by Living Attenuated and Dead Vaccine]—*Rec Trav. Sci Méd Congo Belge* Léopoldville 1942 Jan No 1 pp 86-103 [14 refs]

Most of the main facts and contentions regarding the prophylactic use for immunization of living or dead plague vaccines are now well known. The present authors have experimented with a local virulent strain of plague to test the degree of immunity conferred on guinea pigs by the rival vaccines. Three of these freshly isolated Lake Albert strains were tried out, one obtained from man, one from *Ctenocephalus* and one from *Sarcophylla*. All three killed the guinea pigs (75) without exception in dilutions ranging from 1-1 000 to 1-10 000 000 in a dose of 0.5 cc. The human strain 2831 was chosen for the immunity testing. Full details of the several experiments are available and the general conclusions drawn give the substance of the authors' work. These were—

(1) The strains 2831 of human origin 2846 from *Ctenocephalus* and 2849 from *Sarcophylla* isolated in the endemic plague zone of Lake Albert killing the guinea pig in doses of 5 to 20 organisms can be

considered as highly virulent and satisfying the conditions of infection experiments (2) The avirulent plague strain E V of GIRARD maintained for 12 months in the Belgian Congo had retained its characters of avirulence and immunizing power (3) The laboratory guineapigs proved uniformly sensitive to plague bacilli (4) The strain E V confers immunity in 97 per cent of cases on guineapigs in doses varying from 2 000 million to 1 000 organisms to the inoculation of a standard lethal dose of a very virulent local plague strain (5) Haffkine's vaccine in doses varying from 5 000 million to 1 000 organisms only immunizes the guineapig in 12.5 per cent of cases with the same infecting dose (6) The advantage of vaccination by avirulent living organisms would appear to be such as to justify its current use in spite of difficulties of a local nature The remark is made subsequent to the conclusions that since 1938 several thousands of vaccinations with living avirulent organism have been performed in man without difficulty or inconvenience

W F Harvey

CHOLERA

GORDON (J) & GORDON (M) Involution Forms of the Genus *Vibrio* Produced by Glycine—*Jl Path & Bact* 1943 Jan Vol 55 No 1 pp 63-68 With 2 figs on 1 plate

Glycine had previously been found when added to nutrient media to produce striking morphological changes in organisms of the colityphoid group Their colonies were sticky and tenacious suspension in water as difficult as the organisms became enlarged and swollen Completely normal characters were restored by transference to ordinary nutrient agar Similar degenerative changes have been brought about in other organisms especially in those of the cholera group which forms the subject of the present study Experiments were instituted also to determine whether similar effects could be produced by substances having a lethal effect on cholera organisms and whether these and other substances might inhibit the glycine effect The results of these experiments may be summarized (1) Glycine in concentrations from 0.5 to 1.5 per cent produces stickiness of colonies and causes swelling of the organisms to spherical or oval bodies (2) Glucose produces cocco-bacillary in solution forms of its own and prevents the changes produced by glycine (3) Various substances in concentrations which have a marked inhibitory effect on growth—carboic acid *p*-aminobenzoic acid and α aminomethanesulphonic acid—added to glycine agar prevent the formation of these involution forms Their action may possibly be to interfere with the utilization of the glycine (4) Alanine in high concentration produces a somewhat similar effect to glycine

W F Harvey

REICHES-GESUNDHEITSBLATT 1941 Aug 20 Vol 16 No 34 pp 615-619—Cholera Merkblatt [Memorandum on Cholera]

This publication is exactly what it is entitled and is a plain practical account of what the medical officer and the public authority should know and do in the presence of or on the appearance of cholera or cholera suspected cases It is a public health leaflet and could be

purchased singly or in packets from the Public Health Department. It is essentially text book Applied Tropical Medicine. There are 16 headings which it is interesting to set out: (1) Cause and Nature of Cholera (2) Notification and Regulations (3) Transmission of the Disease (4) Prevention (5) Course (6) Treatment (7) Segregation Procedure and Care of the Patient (8) Rules for Attendants (9) Treatment of Excreta Food and Drink Residues (10) Laundry Clothes and Objects of Use (11) Bacillus Carriers (12) Disinfection of Dwellings (13) Food Trading (14) Conveyance of Cholera Patients (15) Treatment of Cholera Bodies (16) Disinfectants.

Notification of cholera or suspected cholera is incumbent on (1) the doctor (2) the head of the household (3) anyone having dealings with the patient (4) anyone in whose house a case of a suspected case of or a death from cholera has occurred. Inoculation with killed cholera vaccine is recommended prophylactically. 2 to 3 inoculations at intervals of 5 to 10 days. The protection afforded should last 6 to 9 months and vaccination should then be repeated. Disinfectants recommended are cresol (2.5 per cent), quicklime, chlorinated lime and formalin.

W. I. Harey

BACILLARY DYSENTERY

WALTHER (G.) Ueber Azotämie bei Flexnerruhr [Azotaemia in Flexner Dysentery]—*Klin Woch* 1942 Nov 7 Vol 21 No 45 pp 988-991

This paper gives the results of blood chemical analyses in 49 cases of moderate and severe Flexner dysentery seen in the Russian campaign in 1941.

Methods—For Rest N estimation the serum proteins were precipitated with 1.55 per cent uranium acetate solution. For non protein nitrogen the serum protein precipitant was 5 per cent trichloroacetic acid. The nitrogen content of the filtrates was estimated by ashing and Nesslerization.

[Rest nitrogen is total non protein nitrogen plus nitrogen derived from diamino acids and high molecular weight polypeptides.]

The total volume of circulating plasma was indirectly deduced from its protein concentration on the assumption that the total weight of circulating protein remained roughly constant and therefore that increase in concentration of protein in the plasma indicated reduction in circulating volume. If the plasma protein concentration was found to be twice normal the total plasma volume was assumed to be halved [this is very doubtful and incidentally the figures give the surprising result that the milder cases of dysentery had very low plasma volumes whereas the severe cases had volumes approaching normal. The derived figures for total circulating rest N are therefore of little value.]

Results—Concentrations of rest N were found from 43 to 120 milligrammes per 100 cc (normal 20-40).

On the whole the severer cases had the higher concentrations which dropped towards normal as the patients recovered from the dysentery. No close relation was found between rest N and Na or chloride concentrations in the plasma.

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There was a striking drop in Difference N concentration (i.e. rest N minus non protein N) as the patients recovered. No tests were performed to assess renal function. Nitrogen retention in severe diarrhoea is well known and probably has more than one cause namely haemo-concentration due to water loss increased protein breakdown in a severe infective disease renal failure due to toxic effects on kidney parenchyma. [No mention is made of the possibility of renal failure due to diminished volume of circulating blood this paper throws no new light on the cause of nitrogen retention in severe diarrhoea.]

H. K. Goadby

Wilson (D. C.) Notes on the Treatment of Bacillary Dysentery—Jl Roy Soc Med Ser 1942 Oct Vol 28 No 4 pp 357-361

This is a clinical study the result of two years observation in the Middle East.

Dia nosis—In addition to the text book symptoms an almost constant diagnostic sign was tenderness over the descending colon in 95 per cent and as diminution in pain coincided with improvement in the general condition it served as a useful indication in treatment. Diagnosis should be made provisionally on physical signs together with cytodiagnosis of stools and treatment instituted without delay. Blood slides should be examined immediately to exclude the possibility of subtertian malaria.

Treatme t—Cases are divided into mild moderate and severe which roughly corresponded to *B. flexneri* or *sonnei* (mild) *flexneri* (moderate) and *shigae* (severe). In all types of less than three days duration treatment as initiated with a dose of half an ounce of castor oil and the patient as kept on water only in ample quantities. Sodium sulphate was employed in mild cases only as no advantage is to be gained by further dehydration an already dehydrated patient the stools have become faecal and recovery should be complete by the 10th day. Moderate cases when the infection is due to *Bac. shigae* responded quickly and satisfactorily to sulphaguanidine. The results with this drug compared with the previous treatment as sodium sulphate were startling. The average time of recovery was reduced from 10-16 to 7 days. The dosage of sulphaguanidine was 0.1 gm per kilo as initial dose followed by 0.05 gm per kilo every four hours till the number of stools fell to five in 24 hours thereafter 0.05 gm per kilo eight hourly.

In practice it was found that 60-90 gm were given in three or four days in moderate cases. In no case was any reaction or drug toxæmia observed.

Sulphonamide (sic) was tried out in a series of moderate cases but in order to obtain results it was necessary to keep concentration high by giving an initial dose of 2 gm followed by 1 gm every 4 hours for 24 hours then 1 gm four hourly for a further period of the same duration by which time signs of toxæmia had been set in. The results were on the whole good but in a few cases sulphaguanidine had to be substituted owing to lack of response.

The severe cases were medical emergencies and were put on sulphaguanidine as soon as possible and 40 000 units of shigæ anti-dysenteric serum were injected intramuscularly. Dehydration was treated by

drip transfusion 5 per cent glucose in normal saline up to 10 pints if necessary but when stool culture was positive for *Bact shigae* and the condition of the patient indicated it anti serum up to 100 000 units was added to the drip

Cases with commencing peripheral vascular failure with blood pressure below 100 mm were given a pint of plasma in addition Good nursing is most important and sister and ward staff should be experienced in the management of dysentery Patients should be encouraged to drink large quantities of fluid and the provision of suitable diet in all stages is important Stout is the most useful tonic in convalescence Since the advent of sulphaguanidine the occurrence of complications has diminished

Pain colicky or continuous is relieved by tinct opii 15 min at night This has the added advantage of slowing peristalsis and thus permitting greater concentration and more prolonged action of sulphaguanidine Haemorrhage was very serious in five cases but appendicostomy to relieve tension in the large intestine proved entirely successful In the sixth it was only partially so so that transverse colostomy was performed and resulted in stopping further blood loss subsequently the colostomy was closed

Hiccough appeared to be due to deep ulceration into the muscular coat giving rise to peritoneal irritation and was invariably a symptom of great gravity In three fatal cases perforation occurred All cases of arthritis eventually recovered though no specific treatment appears to hasten recovery

Twenty cases with controls were treated with bacteriophage supplied by Dr COMPTON but the results were variable and disappointing as compared with those obtained with sulphaguanidine In a period of two years over 3 000 cases were admitted as possible dysenteries of which 1 978 were bacteriologically positive There were seven deaths giving a case mortality of 3.5 per thousand the causes being perforation of the large intestine 3 peripheral vascular failure 1 toxæmia 2 pneumonia 1

P Manson Bahr

BULMER (Ernest) & PRIEST (W M) Sulphaguanidine in the Treatment of Bacillary Dysentery—*Jl Roy Army Med Corps* 1942 Dec Vol 79 No 6 pp 277-286 With 1 chart

During 1941 out of 2 066 soldiers treated for acute diarrhoeal diseases in the Middle East more than one quarter (504) were suffering from bacillary dysentery 76 patients were treated with sulphaguanidine and there were two deaths The use of the drug was restricted to carefully selected patients who comprised 13 per cent of the whole Patients received nothing but water for the first 12 hours Salines were withheld on the grounds that purgation of an already dehydrated patient was undesirable In very acute cases blood and plasma transfusions have been given with marked benefit There were few grave cases in the series and complications were almost absent On the whole the disease has been mild or moderate in severity and there has been a tendency to chronicity Complications were rare there was one case of arthritis and one of benign haemorrhagic nephritis unaccompanied by oedema or nitrogen retention this patient recovered in three days Standard doses of sulphaguanidine were adopted as the drug was found to be entirely non toxic An initial dose of 6 gm was given

and thereafter the drug was continued in doses of 3 gm four hourly until faecal porridgy stool were passed and general clinical improvement had been maintained for two or three days then 3 gm thrice daily for three or more days. The total quantity varied from 18 gm to as much as 350 gm the average effective dose was not less than 50 gm but was usually between 100 and 200 gm.

There were 34 acute and 15 chronic cases. Both the patients who died were in a critical condition on admission. One had a large pericolic abscess. There were three failures but these eventually recovered in spite of apparent non response to sulphaguanidine. One had a severe Sonne infection which eventually recovered after rectal instillation of sulphonamide.

The authors regard general impressions as of greater value than any figures. The effects of sulphaguanidine may be judged by a change in the patient's general condition and improvement in stools. A notable diminution in temperature pain and toxæmia took place within 24 hours this was frequently dramatic and was fully appreciated by the patient. The change in the character of the stools is most impressive. In most cases they become porridgy and faecal within 48 hours nothing comparable has been seen in saline-treated cases.

The authors conclude that sulphaguanidine appears to be as specific against dysentery bacilli as sulphapyridine is against the pneumococcus.

P. Manson Bahr

POTH (Edgar J.) CHENOWETH (Beach M.) Jr & KNOTTS (F. Louis) A Preliminary Report on the Treatment of Bacillary Dysentery with Succinyl Sulfathiazole — *J. Lab. & Clin. Med.* 1942. Nov. Vol. 28 No. 2 pp. 162-167 [16 ref.]

Experiment and clinical foundation for the use of succinyl sulphathiazole in the treatment of bacillary dysentery has already been laid by the two senior authors. They demonstrated that this drug had a much greater local activity against coliform organisms in the bowel than sulphathiazole and sulphaguanidine. It is claimed that the character of the faeces is profoundly altered by the action of succinyl sulphathiazole and that they become practically odourless.

The toxicity of this drug is unusually low and approximately 5 per cent of the ingested compound is excreted by the kidneys when diarrhoea is absent.

The customary general symptomatic treatment was given to all patients including the administration of adequate perenteral fluid. The diagnosis of bacillary dysentery was confirmed bacteriologically in all cases. The drug was given by the mouth and the dosage varied from 0.2 gm to 1.0 gm per kilo daily divided into six equal portions. The length of treatment was from two to sixteen days. There were no failures or deaths and the patients ranged in age from eight weeks to 83 years.

The response of ten children and infants when treated with succinyl sulphathiazole was prompt whether treatment was begun early or late in the disease and it appears to be equally good with smaller as with larger dose. The temperature returned to normal in twenty four hours or less in all instances save one. The results of treatment of ten adults with succinyl sulphathiazole were equally good. The dosage was 0.25 gm to 0.5 gm per kilo daily over a period from 4-17 days [The doses given in this paper seem to be exceedingly high.]

The number of patients in this series was insufficient to determine accurately the minimum dosage of the drug and the shortest period of therapy required for the successful treatment with this drug. It appears that in most instances larger quantities were given and for longer periods than was necessary.

Bacteriological studies showed that *Shiga's bacillus* is especially susceptible to succinyl sulphathiazole. Dysentery bacilli disappear from the stools within 48 hours. The authors consider that it is significant that the response is immediate even when the disease has been present for as long as three months before treatment is undertaken. It is emphasized that treatment of bacillary dysentery in the United States is specially favoured by the excellent nutrition of the majority of patients.

P Manson Bahr

LEPROSY

BRITISH EMPIRE LEPROSY RELIEF ASSOCIATION (MADRAS PROVINCIAL COUNCIL) Annual Report 1941-42 [ALSTIN (T) Chairman - Executive Committee]—26 pp Chingleput Printed at the Arpudha Press

Much of the more important work summarized in this report has been already published and some is of local interest only. The following points are noteworthy. Special attention has been paid by Dr R G COCHRANE to leprosy in childhood and a children's Leprosy Sanatorium has now been opened in the Salem district with 25 residents and an out patient clinic. Some success has been obtained with the plan of inducing infective patients in villages to attend for night segregation with a view to limiting contact infections arising from them but it is too soon to estimate its value. The headquarters of the Madras work is at the Lady Willingdon Leprosy Sanatorium where much clinical research is being carried out. Epidemiological studies indicate that if the child rate is higher than that of adults the disease is probably spreading. House and family contact is by far the most important factor in relation to severe infections among children. No instance of early simple macular cases becoming bacteriologically positive have been met with. Lepromin tests gave very similar results to those reported from Calcutta.

L Rogers

DEGOTTE (J) Application pratique des troubles de la sudation à l'établissement de l'observation clinique des lépreux [Investigation of Sweating Dysfunction in the Diagnosis of Leprosy]—*Rec Trav. Sci. Méd. Congo Belge* Léopoldville 1942 Jan No 1 pp 135-136 With 1 plate

The author points out that in the Belgian Congo the prophylaxis of leprosy largely depends on early treatment in the macular stage in the diagnosis of which he finds alteration in sweating to be the most frequent and objective diagnostic sign. To detect and measure this sign he injects pilocarpine to induce sweating followed by swabbing the surface with an alcoholic solution of iodine and then powdering with starch to produce blue points at the sites of the sweat glands. In order to be able to preserve records of the changes in the functions

[May 1943]

of the sweat glands he made use of the fact that sweat contains a notable amount of chlorides which react with silver nitrate to form silver chloride which quickly becomes black on exposure to light. He therefore covered transparent paper with 5 per cent silver nitrate in 4 per cent gelatine and applied it to the sweating surface to bring out the activity of the sweat gland and he preserved the negatives by treating them for a few seconds in a bath of paraffin at 100-110° L. Roers

HELMINTHIASIS

DORRER (B. A.) A Preliminary Survey of Bilharzia in Native Schools in River Valleys on the Natal Coast—*South African Med J* 1942
Oct 10 Vol 16 No 19 pp 353-354 With 1 map

The author surveyed the area (of which a sketch map is given) between the Tugela and Umkomaas Valleys and up to 25 miles inland from these. Only 18 days were allowed for the survey so that one or at most two schools in each river valley were chosen (out of 119 schools in the whole area). Each child in these schools was asked whether blood was passed in the urine. No reliance was placed on replies stating that blood had been passed formerly.

Eggs of *Schistosoma haematobium* were found in the uncentrifuged deposit of the urine of 99 per cent of children showing haematuria at the time of the examination. Centrifuged specimens were also examined. In most of the schools some children were passing blood in the stools. In one of these eggs of *S. mansoni* were found and in one eggs of *S. haematobium* other contained eggs of *A. canis hook* worms and *Trichuris* and cysts of *Entamoeba histolytica* and *E. coli*.

All children passed blood in their stools were examined in a general way for undernourishment but exact weights heights etc were not noted. A clinical impression of vitamin deficiency was obtained from the appearance of the skin eyes lips naso-labial fold, teeth and gums.

Of the 4489 children examined active urinary bilharzia was found in 10 per cent. The minimum was 0.87 per cent in one of the Umvoti Valley schools and the maximum 39.61 per cent in the Umkomaas Valley school. Further and more exact surveys are planned. G. Lapeere

GELFAND (M.) The Clinical Features of Intestinal Bilharziasis (*S. mansoni*)—*Clin Proc* Cape Town 1942 Aug Vol. 1 No 8 pp 247-252

Bilharzia is the commonest disease next to malaria in Southern Rhodesia. It causes many deaths and predisposes to avitaminoses, tuberculosis, pneumonia and many other diseases. Apart from its medical importance it is responsible for serious economic loss. Its prevention is being attempted.

Bilharzia is a chronic infective illness with many resemblances to syphilis and tuberculosis. It may attack practically every organ. Attention has been concentrated too much on the local symptoms in the bowel or bladder and the general constitutional symptoms have

been overlooked so that diagnosis is often missed if local symptoms are absent or so mild that they are not observed by the patient. Thus applies especially to infestations with *Schistosoma mansoni* in the bladder. There may be no bowel symptoms the patient stressing his lack of energy and loss of weight. Three main clinical varieties of these infestations exist in *S. Rhodesi*.

Group 1 is the largest patients showing general symptoms of which urticaria and pyrexia occurring within a few weeks of exposure to infection are the most important. The cercariae are then still in the blood. This invasive phase is called Katayama disease in Japan and elsewhere it continues for a few weeks and the diagnosis may be missed. The author describes what he believes to be the first instance of it to be reported from *S. Rhodesi*. The patient was a European boy aged 10 who infected himself in a river. Three weeks later he had a sudden rigor (102 F). The temperature rose each evening. Malaria enteric and undulant fever were excluded. Four days after the rigor the penis began to swell and the next day there were urticarial swellings all over the body. The temperature continued eosinophilia was 33 per cent but no eggs could be found in the faeces or urine. After four weeks the temperature subsided and six weeks later eggs of *S. mansoni* were found in the stools. The combination of fever urticaria and eosinophilia should call early bilharzia to mind. Later on general symptoms may occur with eggs in the stools but no bowel symptoms that the patient can observe. There may be early loss of weight (often severe in natives who have the disease longer before it is diagnosed) early loss of appetite flatulence and gastric pain (which may simulate peptic ulcer or chronic cholecystitis) debility and lack of energy fever (an evening rise for one to several days) chronic cough due to irritation of the lungs by the eggs which may result in fibrosis of the lung leading to dyspnoea and failure of the right heart [see this *Bulletin* 1938 Vol 35 p 665]. Eosinophilia occurred in about one-third of Gelfand's cases being less frequent in the later stages and only rarely high. Slight or moderate hypochromic anaemia may occur and the blood sedimentation rate was increased in rather more than half his cases. Gelfand does not think mental retardation and epileptiform seizures are due to bilharzia.

In Group 2 the bowel symptoms are the chief complaints. Abdominal pain periodic and usually mild diarrhoea with blood and mucus and eggs in the stools are found in a few Europeans and natives constipation may be the main trouble. The author does not think that haemorrhoids and pruritus ani are caused by *S. mansoni*.

Group 3 includes the late stages which occur 10-30 years or sometimes earlier after infestation. Some of these patients have eggs in the liver which cause hepatitis and later cirrhosis of the liver and splenomegaly (Egyptian splenomegaly) especially in natives. Cirrhosis may not develop for many years being preceded by repeated attacks of transitory jaundice which may closely resemble infective hepatitis at this earlier stage antimony may effect a cure but it cannot do so when cirrhosis has developed. Death may then result from pneumonia tuberculosis cholaemia portal thrombosis cancer of the liver or haemorrhage. In other cases deficiency diseases or infective illnesses (pneumonia tuberculosis) due to lowered resistance develop these have been found in natives only because the European gets earlier treatment.

SARJABIN (I. I.) & MATHEVOSSIAN (E. M.) Types of Topographical Correlations of Sexual Glands in Cestodes of the Family *Hymenolepididae* and their Taxonomic Significance—C. R. (Doklady) Acad. Sci. URSS 1942 Vol 36 No 1 pp 3-35 With 1 fig

SARJABIN (I. I.) & MATHEVOSSIAN (E. M.) Stages in the Postembryonal Development of Cestodes of the Family *Hymenolepididae* and an Attempt to establish Morphological Types of their Larvae—C. R. (Doklady) Acad. Sci. URSS 1942 Vol 35 No 3 pp 83-85 With 3 figs

SARJABIN (I. I.) & MATHEVOSSIAN (E. M.) Typical Morphological Modifications of the Chitinous Organs of the Scolex in Cestodes from the Family *Hymenolepididae*—C. R. (Doklady) Acad. Sci. URSS 1942 Vol 35 No 3 pp 86-88 With 1 fig

VENZANT QUINTANA (Enrique) Infiltrado de Loeffler provocado por el Necator Americano [Loeffler's Infiltration caused by *Necator americanus*]—Rev. Méd. Quirúrg. de Oriente, Santiago de Cuba 1942 Sept Vol 3 No 3 pp 159-161 With 2 figs

The author has already published with CORDIÉS accounts of three cases of transient pulmonary infiltration. He concluded that the infiltration was allergic. A further case is here described: the patient being a youth aged 14 who complained of cough and pain in the shoulders and weariness. There was no fever and no other signs of disease were found. The patient's five brothers and both his parents were alive and well. He said that his family was free from tuberculosis. His lips were thick, his nose thick and eroded, his face doughy, as in the exudative diathesis. The lungs and heart were normal but fluoroscopic examination showed a paracardiac infiltration of the base of the left lung which was confirmed by radiography. Photographs illustrate this. There was an eosinophilia of 8 per cent and the faeces contained eggs of *Necator americanus* and *Trichuris*. Anthelmintics with rest in bed and anti-anæmic treatment resulted after 13 days in the disappearance of the infiltration and of the eggs of *Necator*, but the eosinophilia was then 10 per cent.

The author thinks that the case showed the two characteristics of Loeffler's syndrome, namely a transient infiltration and an eosinophilia which disappears with the infiltration. [This is not clear because he states that the eosinophilia before treatment was 8 per cent while it was 10 per cent when the infiltration had disappeared.] In his earlier cases there had been little eosinophilia. He thought the case was allergic, the allergen being derived from the products of the parasites. During the subsequent discussion FONSECA said that there could be a simple coincidence between eosinophilia due to parasites and transient infiltrations like those described earlier by Venzant. [See also this Bulletin 1941 Vol 38 pp 538-539] G. Lapa e

HEILIG (Robert) & VISWESWAR Influence of Anti-Anæmic Treatment on the Gastric Function in Hookworm Disease—Indian Med. Gaz. 1942 July Vol 77 No 7 pp 385-390 With 6 figs

It is believed, say the authors, that stomach function influences the condition of the blood, deficiency of HCl, for example, impairing the utilization of iron in the food, and that inability of the stomach

to form Castle's intrinsic factor which is necessary for building the anti-anaemic or anaemia preventing factor from the extrinsic factor is one of the main mechanisms leading to pernicious anaemia. But how the authors ask is the stomach influenced by changes in the condition of the blood? Practically nothing is known about correlation of haemopoietic and stomach functions in cases of hookworm anaemia undergoing iron treatment.

The authors studied this question in 51 hospital patients (43 men and 8 women) suffering from hookworm anaemia. On admission the number of erythrocytes, the haemoglobin values and gastric acidity were noted. Out of the 51 patients 37 were selected for further investigation, all of the selected ones being free from other active disease and afebrile with a haemoglobin value on admission of not more than 20 per cent (Sahli). The haemoglobin value, number of erythrocytes and gastric acidity of these 37 were noted every week during iron treatment (Blaud's pill 90 grains a day) until the haemoglobin reached 30-40 per cent. This usually required 3-4 weeks. Anthelmintics (not specified) were then given. The results given below apply to patients before deworming.

Of the 37 patients studied further 7 (19 per cent) were achlorhydric on admission, 10 (27 per cent) were hypochlorhydric, 11 (30 per cent) were normal and 9 (24 per cent) were hyperchlorhydric. Graphs and tables show the condensed estimates of the haemoglobin, erythrocyte number and gastric acidity, the results being treated in three groups—achlorhydric, hypochlorhydric and a combination of normal and hyperchlorhydric.

In the achlorhydric group the averages of 7 cases showed after 4 weeks of iron increases of free HCl from 0 to 2, total acidity varied from 7 to 10, haemoglobin rose steeply from 14 to 39. In the hypochlorhydric group the averages of 10 cases showed after 4 weeks of iron a rise of free HCl from 5 to 6, total acidity remained constant at 15, and the haemoglobin rose from 16 to 40.6 per cent. In the normal hyperchlorhydric group the averages of 20 cases showed after 4 weeks of iron that the free HCl remained practically unchanged (varying from 25 to 24), the total acidity varied from 36 to 33 and that the haemoglobin rose from 13.2 to 33.7 per cent. Comparison of the results with those of the earlier workers quoted and with values obtained from normal Indians indicates that among 51 cases of hookworm anaemia in Mysore the percentage having a gastric acidity below 20 free HCl is twice as high (42 per cent) as it is among 91 normal Mysoreans (22 per cent). The blood of 37 subjects of hookworm anaemia was greatly improved by 4 weeks of iron treatment, but the increase of free HCl was so small that it did not affect the efficiency of the stomach function. Similar facts are known regarding pernicious anaemia and idiopathic hypochromic anaemia in which the changes in gastric function are as in hookworm anaemia without deworming irreversible. The improvement in the blood in these cases was independent of the gastric acidity; it occurred more quickly and extensively in the achlorhydric than in the normal hyperchlorhydric group. Thus the average haemoglobin value on admission was lowest in the normal and hyperchlorhydric groups (13.2 per cent) as against 16 per cent in the hypochlorhydric and 14 per cent in the achlorhydric groups. After 4 weeks of iron treatment the haemoglobin value was lowest in the normal and hyperchlorhydric groups (33.7 per cent) as against 40.6 per cent in the hypochlorhydric and 39 per cent in the

achlorhydric groups. Thus neither production of free HCl nor the pH of the gastric juice were deciding factors in the utilization of the iron. Actually the absolute increase in haemoglobin was highest in the achlorhydric group (25 per cent). It was about the same in the hypochlorhydric (24.6 per cent) and only 20.5 per cent in the normal and the hyperchlorhydric groups.

G. Lapage

NINO (Clavio L.) Appendicitis verminosa por *Enterobius vermicularis* [Vermineous Appendicitis caused by *Enterobius vermicularis*]
—*Bol. Int. Clin. Quirur.* Buenos Aires 1942 Sept Vol 18
No 149 pp 683-692 With 8 fig.

The author refers to his four earlier papers in which he emphasizes the importance of the part that may be played by parasites in the production of an appendicular syndrome. After reading the histories of the 24 cases of appendicitis ascribed to *Enterobius vermicularis* recorded in the Institute of Clinical Surgery at Buenos Aires he is impressed by the fact that doctors may not diagnose the condition until they get the histopathological report owing to lack of sufficient questioning of the patient and to excess of modesty of the patients who may not mention the anal pruritus and its nocturnal exacerbations. It is not uncommon to find that removal of the appendix has not improved the condition of the patient. Systematic parasitological examination of all cases for which appendicectomy is proposed might detect the parasites and their treatment before or after the operation and would benefit the patients. In the subsequent discussion EGUES agreed with these views.

Nino describes two other cases which leave he thinks no doubt that *Enterobius vermicularis* can cause the appendicular syndrome.

The first case was an Argentine man aged 37 who had had pain in the right iliac fossa for 15 years with nausea and vomiting. Periodical constipation, gastric dyspepsia and loss of red blood not mixed with the faeces and suggesting haemorrhoids were among the symptoms complained of. There was painful colic on deep palpation. Some sections of the excised appendix showed follicular hyperplasia of the submucosa. Others showed haemorrhagic foci with mucosal ulcers and submucous abscess. The microphotographs show sections of *E. vermicularis*. In one of them four worms are seen at the bottoms of two ulcers which extend to the muscularis and there are portions of five other worms in the lumen. Other microphotographs show the head of a worm buried in a lymphoid follicle with tissue in its mouth. [The reproductions do not show this very well.]

The other case was an Argentine woman aged 18 who had suffered for years from pains in the right iliac fossa extending to the right leg and hindering movement. She had had nausea and persistent constipation. There was pain at McBurney's point and a distended colon. One section of the excised appendix showed marked lymphoid hyperplasia without parasites or other apparent lesion. Another showed follicular hyperplasia with 13 worms in the lumen in intimate relation with the mucosa. Another showed a rather atrophied mucosa with seven worms in the lumen. Another showed three ulcers in the mucosa, one of which reached the muscularis and had a worm in its cavity and there were three worms in the lumen.

Of the 24 cases recorded at the author's Institute up to date seven were males and 17 females which corresponds with the greater frequency of *E. vermicularis* in females.

In the subsequent discussion JURADO said that 18 per cent of a large number of cases of appendicitis collected by him were parasitic. REY described a case illustrating his view that amoebic infection may be a misleading complication of cases of appendicitis.

G Lapage

CHOMET (B) *Oxyuris Vermicularis* Infection of the Wall of a Falloplan Tube—*Arch Pathology* 1942 Oct Vol 34 No 4 pp 742-744
With 1 fig

A case is reported of infection of a fallopian tube by *Oxyuris vermicularis* probably due to transport from the lower genital canal.

STOWENS (Daniel) The Effect of Ultraviolet Irradiation on *Trichinella spiralis*—*Amer Jt Hyg* 1942 Nov Vol 36 No 3 pp 264-268 With 1 fig [10 refs]

The author tried the effect of ultraviolet irradiation of the intestinal and muscle phases of *Trichinella spiralis*. HOLLANDER JONES and JACOBS have shown that it has an effect on *Enterobius vermicularis*. Larvae of *Trichinella* were exposed in a quartz cup 12 inches away from a high frequency lamp giving rays between 2 650 and 3 200 Å for periods varying between 5 and 120 minutes. These were given in food to mice all the larvae being motile at the time. Controls were fed with larvae which had not been irradiated. Adults and larvae were then obtained from the infected mice. For the intestinal phases the mice were killed between the 3rd and 5th days after the irradiation of the larvae. The number of adults recoverable from the intestine was reduced from 14.8 per cent less than the number found in the controls with an exposure of 5 minutes to 99.5 per cent less with an exposure of 2 hours. The reduction in the number of adult worms recovered was commensurate with the length of the exposure to ultra violet irradiation. There was no apparent morphological change in the adult worms which developed from irradiated larvae. For the recovery of larvae from the muscles of infected mice the animals were killed 4 weeks after infection and the larvae were recovered by McCoy's technique. The number of larvae in the muscles was reduced from 58 per cent less than the number found in controls with an exposure of 5 minutes to 100 per cent less (i.e. nil) with exposures of 1 and 2 hours.

Because the larvae were suspended in a gelatin broth containing protein which absorbs ultra violet rays the procedure was checked by exposing larvae in distilled water on a glass slide to ultra violet light. All the larvae thus exposed were killed in 10 minutes although most of them survived an exposure of 6 minutes. The unexposed controls were alive after 10 minutes. Thus the gelatin broth protected the larvae considerably. The author suggests that the ultra violet light may inhibit the enzymes of digestion and oxidation reduction. Motility is not a criterion of infectivity because all the larvae given to the mice were motile at the time.

Thus ultra violet light impairs the ability of the larvae to establish themselves in the intestine and this is reflected in the reduction of the number of larvae found in the muscles. These effects increase with the increase in the time of exposure to ultra violet light.

G Lapage

The disease not infrequently diagnosed as chronic phthisis or bronchial asthma runs a benign course although if untreated it may last for years. It is not considered to be an allergic manifestation and has no connexion with Loeffler's syndrome [see this *Bulletin* 1942 Vol 39 p 792]. The cause has not yet been determined.

Treatment was symptomatic until the administration of neo-phenamine to a patient suffering also from syphilis was followed by subsidence of the respiratory symptoms and a fall in the leucocytes from 64,200 to 7,800 per cmm representing a decrease in the eosinophils from 71 to 16 per cent. Arsenical treatment of other patients suffering from the syndrome was then undertaken and the results were similarly favourable. There appear to have been no relapses.

The aetiology is unknown but most of the patients seen lived near the sea.

F. Muir Boyd

VENOMS AND ANTIVENOMS

VELLARD (J) Modificaciones sanguíneas provocadas por los venenos. Acción hemolítica y variaciones de la resistencia globular in vivo. Blood Changes set up by Snake Venoms. Haemolytic Action and Changes in Corpuscle Resistance (to Haemolysis).—*Rev. Inst. Bacteriol.* Dr Carlos G. Malbrán. Buenos Aires 1941 Dec Vol 11 No 2 pp 144-167.

The information given in this article is already very condensed and hence is difficult to abstract. The results of a large number of very interesting experiments are presented in protocols and should be carefully studied by all working on the effects of snake poisons on the blood. To convey an adequate idea of the experiments would necessitate reproduction of many of these protocols and we must consequently limit ourselves to the main outlines of the investigation.]

Twelve samples of venom have been studied. *Naja tripudians* from Bombay. *Elaps temminckii* (Coral snake) from N.E. Brazil. *Lachesis muta* from N.E. Brazil. *Croalus terrificus* from Venezuela. N.E. Brazil. Central Brazil and the Argentine. four samples. *Bothrops atrox* Venezuela and N.E. Brazil two samples. *Bothrops jararaca* from Rio de Janeiro. *B. erythromelas* from N.E. Brazil and *B. alternata* from the Argentine. The investigation included (1) The haemolytic power of serum of dogs (which were the animals used for these experiments) on normal corpuscles collected and washed before addition of the venom. (2) Haemolytic power of the serum on washed sheep-cells. (3) The same for the horse. (4) As (1) but with added venom. (5) Corpuscle resistance to hypotonic solutions. (6) Corpuscle resistance to the haemolytic action of the venom in the presence of normal horse-serum.

The venoms are grouped as regards haemolysis and coagulation into three categories—

- 1 Haemolytic but not coagulant. *N. tripudians* *E. temminckii*
- 2 Haemolytic and coagulant. *C. terrificus* *L. muta* *B. atrox* and *B. erythromelas*
- 3 Coagulant and non haemolytic (or very slightly so). *B. alternata* *B. jararaca*

Not only do the poisons of different species vary in action but specimens of the same species from different localities also vary. Thus *C. terrificus* poison in a Pernambuco specimen has little or no proteolytic action and its coagulant and haemolytic actions are less than those of Venezuelan specimens. Poison from an Argentine *C. terrificus* is markedly coagulant *in vitro* but less haemolytic than that from Pernambuco and that from a Central Brazilian specimen was very feebly haemolytic and had no proteolytic action.

To sum up. Venoms with marked phosphatidase properties but non coagulant as *N. tripudians* produce in the dog strong haemolysis—positive phase—which is always brief then follows a negative phase in which phosphatids are destroyed and the haemolytic properties disappear and the corpuscle resistance returns to normal. The lowered resistance of the positive phase is due to circulatory haemolysins and the poison acts directly on the corpuscle phosphatids just as it does on those of the plasma. The red cells increase in volume without spontaneous haemolysis but the resistance to the venom haemolysins is reduced then the second negative phase sets in and the corpuscle resistance progressively increases. The rapidity of the change depends naturally on the mode of introduction of the venom and the dose but it may be said that autohaemolysins rarely persist in the circulation for more than an hour (average 30–45 minutes) but regeneration of the phosphatids is always gradual taking more than 24 hours. [See also this *Bulletin* 1942 Vol 39 p 880.]

H Harold Scott

TRETHERWIE (E. R.) Tissue Injury by Trypsin—*Australian Jl Experim Biol & Med Sci* 1942 Mar Vol 20 Pt 1 pp 49–54 With 5 figs [19 refs]

This is a very interesting but highly technical article and those wishing to confirm the author's results should consult the original for details of the experimental work.

Agents which cause tissue injury snake venom for example liberate several pharmacologically active substances histamine lysocithin adenyly compounds an inactivating enzyme and others. The author has carried out investigations to see if the liberation of certain of these substances could be ascribed to specific attributes of the injurious agent. He has previously shown that the property of snake venom of liberating histamine and what he designates slow reacting substance (SRS) is paralleled by its haemolytic activity. Trypsin injected into the excised liver of a rabbit by an intraportal cannula liberates SRS adenyly compounds and an inactivating enzyme. Trypsin is proteolytic in action and alters the permeability of the cell membrane and inner cell structure thus liberating the substances mentioned. In other words trypsin is a proteoclastic enzyme which acts on the lipoprotein of the cell membrane and cell substance.

The application of these findings to the action of snake venom is that in the venom as FELDBERG and KELLAWAY have demonstrated is a lipoclastic enzyme which will split off oleic acid from lecithin to form lysocithin lecithin itself being a constituent of cell membrane and lysocithin has a powerful haemolytic action. In view of the similarity of the substances liberated by trypsin and by snake venom

it is perhaps not surprising that few conditions produce so rapid and so severe a state of shock as evere snake bite [See also this Bulletin 1939 Vol 36 pp 564 565] H Harold Scott

DERMATOLOGY AND FUNGOUS DISEASES

VOLK (Ricardo) & CANAS (Eugenio) Un caso de blastomicosis [A Case of Blastomycosis]—*Medicina Mexico* 1942 Dec 25 Vol 22 No 476 pp 615-623 With 7 figs

The case here recorded as blastomycosis should perhaps be classed as Geotrichosis in view of the fungus isolated and grown from the lesions—a species (unnamed) of *Geotrichum*. The patient was a man of 33 years who at the age of 20 received a blow on his left foot which he said splintered the bone but was healed by moist applications and ointments. The place broke out and healed again from time to time during eight years and he then went to hospital where the bones were scraped and healing again followed. After that small swellings appeared on the dorsum of the foot and discharged pus then cicatrized and broken down on and off for 5-6 years and he underwent the scraping operation again. Four years ago three swellings appeared on the left thigh about 5 cm in diameter which suppurated and discharged a gummy material. A variety of treatments were tried—rubiazol solusalvarsan bismuth injections potassium iodide in large doses internally, but all were ineffectual. They are now papules or pustules 8 cm in diameter and increasing slowly 1-2 cm a month. They appear as agglomerated minute abscesses with yellow points at times dark red to violet. There are also papillomata over the metatarso phalangeal articulations of the left foot and in the groin enlarged glands not adherent. The patient states that the lesions are painless and he has had no fever. Several reactions for syphilis—Wassermann Kahn Kline Meinicke and others—have been tested with uniformly negative results. A species not identified of *Geotrichum* was grown on Sabouraud's medium with 2 per cent glucose. H Harold Scott

CARRIÓN (A L.) Chromoblastomycosis—*Mycologia* 1942 Vol 34 No 4 pp 424-441 With 6 figs & 1 diagram [Summary taken from *Rev. Applied Mycology* 1943 Jan Vol 22 Pt 1 p 23]

After reviewing the history, geographical distribution and clinical features of chromoblastomycosis the author states that repeated observations on many isolates from different parts of the world show that sporulation in the fungi associated with the disease may be of the *Hormodendrum* (*Cladosporium*) *Phialophora* or *Acrotheca* type. A few of the fungi concerned appear to sporulate by one or other of these methods exclusively but in most of them at least two occur simultaneously in the individual isolates. The organisms behaving in this manner have been classified as two species of *Fonsecaea* *F. pedrosoi* (Brumpt) Negroni and *F. compactum* Carrion (represented by one isolate).

CARPENTER (Stanley J) Mosquito Studies in Military Establishments in the Seventh Corps Area during 1941—*Jl Econom Entom* 1942 Aug Vol 35 No 4 pp 558-561 With 1 fig

SINTON (J A) & SHUTE (P G) Memorandum on Measures for the Control of Mosquito Nuisances in Great Britain—Ministry of Health Memo 238/Med Revised Oct 1942 32 pp With 2 plates & 2 maps 1943 London H M S O [67]

This memorandum was first published in 1940 and supplies being exhausted it has been reprinted with some additional information. It is useful both to the entomologist as a summary of practical information and to the medical officer or sanitary inspector as a guide to the mosquitoes liable to become serious pests. The publication of such a booklet in war time is also valuable because troops returning to this country from malarious regions might possibly cause an outbreak similar to that associated with the last war. Two maps given in this edition show that the areas of England and Wales in which the cases then occurred correspond very closely with the areas affected during the 18th century. The explanation appears to be that indigenous malaria in England is restricted to localities infested with *A. maculipennis*.

For each of the biting species of British mosquitoes the habits, distribution and specific measures of control are given (in more or less detail according to prevalence). There is also a useful chart showing at a glance what stages of these species are to be found in different months of the year.

The general section on Control gives extensive instructions for dealing with adults and with larvae and this edition also includes measures against larvae in static water tanks and bomb craters.

Three useful appendices recount (i) the differences between anopheline and culicine mosquitoes (ii) the methods of collection and transportation for identification of specimens and (iii) some information on other bloodsucking flies.

J R BULLINE

ROY (D N) & GHOSH (S M) Further Work on the Comparative Efficacy of Different Culexifuges under Laboratory Conditions—*Parasitology* 1942 Nov Vol 34 Nos 3/4 pp 291-294

Continuing their studies on repellents for mosquitoes [ROY & GHOSH and CHOPRA this *Bulletin* 1942 Vol 39 p 790] the authors have made comparative tests in the laboratory on a long series of formulae proposed by various authors together with a series of essential oils and other substances. The results are set out in tabular form. As in the earlier work mixtures containing pyrethrum were effective for much longer than anything else tested. For example MacNay's preparation (concentrated extract of pyrethrum 1 oz castor oil 4 oz citronella oil 5 drops) remained active for five hours. Of the essential oils clove oil was the best. The deterioration of pyrethrum on exposure to light is mentioned as a disadvantage. In stock mixtures it is stable provided the medium is neutral.

J B HARGREAVES

WASSON (M) Sur la biologie des phlebotomes congolais [On the Biology of Species of *Phlebotomus* in the Congo]—*Rec Travaux Sci Med Congo Belge* Leopoldville 1942 Jan No 1 pp 23-43 With 6 figs & 5 photos on 2 plates [66 refs]

The author's notes on the biology of the larvae and adults of several species of *Phlebotomus* are based on observations made in the field and on laboratory experiments. It seems probable that the work was done at Matadi Belgian Congo.

In general the author regards it as well established that the larvae of most species of *Phlebotomus* feed on ordinary vegetable material and that they have no need of nitrogenous waste of animal origin. He has given a considerable amount of attention to *P. schietzi* and has reared it on living moss and actually observed green material in the gut of the larva. But he has reared the same species and others on dead leaves including the rather hard leaves of the man o' dead leaves are gnawed in a characteristic way. He has also reared the same species in garden earth [no facts are given about the organic content] another favourable material is the very fine deposit from septic tanks in which active decomposition has ceased. On this he has reared several species including *P. schietzi* and *squamipleuris* for several successive generations. It is stated that this material is very rich in decomposed cellulose and that the nitrogen value is very low but no analyses are given. On the other hand he has failed to rear *P. schietzi* on a mixture of earth and blood on lizard dropping green leaves powdered insects and cow dung either fresh or partly dry.

In nature early stages have been found in small numbers in the soil in cavities in rocks dead leaves showing unmistakable signs of having been gnawed were sometimes but not always present. Larvae have not been found in nature in green moss.

Adults in captivity pair either before or after the female has taken a blood meal. Eggs are laid 30-36 hours after the meal. They are laid on the surface of the breeding material in contact with one another but not in a heap and the total number is 30-40. The egg stage lasts 6-8 days and the larval 30-40 days at about 25°C. The full-grown larva looks for some dry environment in which to become a pupa pupal life lasting 8-14 days. Males and females are produced in about equal numbers neither sex tending to emerge before the other. At Matadi and Thysville *P. africanus* was the species most commonly captured. *schietzi*, *squamipleuris* and *transoni* were not infrequent and four other species appeared to be rare. The species differed from one another in their habits in many respects. For instance some are attracted by light others (e.g. *P. schietzi*) are not. Some species do not enter houses and two are apparently cave dwellers feeding on bats as is shown by the precipitin reaction. It is well known that *P. schietzi* feeds on man often biting in the afternoon but it seems that the same species feeds readily on the dog and on laboratory mice but not on guinea-pigs or rabbits. There is also evidence from precipitins that this species will feed on bats and lizards. *P. africanus* also occasionally bites man [which is surprising for the members of the group to which it appertains feed for the most part on reptiles]. The author finds that sandflies will hardly ever feed in a cage of a cubic foot or so. They will readily feed if they are confined in a small glass tube with a lizard or if the tail of a mouse is introduced through a hole in the cork.

The different types of sporulation characteristic of *F. pedrosoi* do not occur in the same proportion in all strains and the group has therefore been subdivided into a number of varieties in accordance with the predominant method of sporulation.

F. pedrosoi var *typicus* corresponds morphologically with Brumpt's original description of *H. pedrosoi*. In this fungus the *Acrotheca* like sporulation reaches its highest development the *Hormodendrum* heads are scant abnormal or depauperate and the *Phialophora* stage rare or missing. In *F. pedrosoi* var *cladosporioides* *Hormodendrum* is the predominant character. In *F. pedrosoi* var *phialophorica* (originally described as *P. macrospora*) the *Phialophora* method of sporulation predominates while typical *Acrotheca* heads are produced and *Hormodendrum* is wanting. Lastly *F. pedrosoi* var *communis* shows all three methods of sporulation and includes numerous integrating forms which represent connecting links among the other three varieties.

As regards the proper generic name for these fungi differences of opinion exist as to whether it should be *Hormodendrum*, *Phialophora* or *Toussiea*. The objections to the use of *Hormodendrum* are that it would not admit certain isolates of the varieties *typicus* and *phialophorica* in which the *Hormodendrum* sporulation has become obsolete and that its application to the species *pedrosoi* has been responsible for most of the confusion. Inclusion in *Phialophora* would be even more confusing. Among the numerous specimens of *pedrosoi* so far studied only in one does the *Phialophora* sporulation predominate. The author suggests that as a matter of convenience *Toussiea* is the most suitable name. The genus is legitimate and comprehensive and covers without strain all varieties of the species *pedrosoi*. It represents a mycologic group possessing distinct pathogenic properties.

The *phialophorica* variety is accordingly named *F. pedrosoi* var *phialophorica* with a Latin diagnosis synonyms being *P. macrospora*, *P. verrucosa* and *Acrotheca pedrosoi*.

CALDWELL (G. I.) Secondary (Granulomatous) Coccidioidomycosis—Coccidioidal Granuloma—*Texas State J. Med.* 1942 Oct Vol 38 p 376 [Summary taken from *J. Amer. Med. Assoc.* 1942 Dec 26 Vol 120 No 17 p 1434]

Caldwell discusses the 7 cases of coccidioidal granuloma that he has had occasion to study. Three of them were reported in 1932 and the other 4 are reported for the first time. He states that certainly 5 of the 7 patients contracted the disease in Texas. The histories of the other 2 are inadequate to conclude where the infection occurred. In 1 it is probable that the infection was acquired in California while in the other 1 there are no data concerning place of residence or travel and none can be secured. In none of the 7 is there any definite evidence that the primary infection occurred in the skin although in one instance ulcers of the legs which were thought to be varicose ulcers might possibly have served as the port through which the chlamydospores of *Coccidioides immitis* entered. However this seems unlikely. Most of the 7 patients had an initial acute coccidioidomycosis which involved the respiratory passages. If the ratio of acute cases of coccidioidal granuloma is around 300 to 1 or even 700 to 1 an appalling number of them are being overlooked in the various communities from which coccidioidal granuloma is reported.

MISCELLANEOUS

FOXO (Edward) Medical Conditions on Bathurst and Melville Islands.
Ned Jt Australia 1942 Sept 12 29th Year Vol. 2 No 11
 pp 230-232. (10 refs.)

These two islands lie direct to the north of Darwin Australia and are separated from the mainland by 50 and 17 miles respectively yet since no permanent white settlement has persisted there, the tribal system has not been broken down. There have been contacts with Asiatic peoples probably for centuries and in recent years the crews of Japanese pearl vessels have visited the islands and have left Japanese-aborigine children the oldest of whom was about 9 years of age when seen in 1939.

For the most part the health and physical condition of the natives are good. Adults are sturdy and well nourished infants are robust. There is a period however between the ages of 2 and 5 when mortality is relatively high and when injudicious feeding in the period of transition between weaning and the proper assimilation of the unmodified adult diet which is given after weaning appears to cause ill health aggravated by the effects of hookworm infection which is particularly evident at this period. Hookworm is widespread in both islands the eggs being found in 106 of 114 specimens and an average haemoglobin value of 53 per cent. was found in 33 children examined. Respiratory diseases are common and tuberculosis both of the lungs and of the cervical gland was seen there were a few cases of leprosy.

The situation with regard to malaria is peculiar. The author found no evidence of it in the form either of enlargement of the spleen or of positive blood smears yet there are records of epidemics of subtertian malaria in the 19th century and in 1911. No mention of anophelines is made. Yaw is fairly common. Suppurative conditions are prevalent especially in the wet season the destructive skin disease of the face (known as *bila bila*) was seen (for a description see this Bulletin 1941 Vol 33 p 535).

Veneral diseases include ulcerating granuloma of the pudenda and many patients suffering from this have been taken to Darwin for treatment. Gonorrhoea is found but no evidence of syphilis was seen. C II

EBOLE (Felix) Discours en conseil d'administration Afrique Equatoriale Française (Afrique Française Libre) 19 Novembre 1942. (Health Services of French Equatorial Africa.)—36 pp
 [Service de Santé p 16]

In this speech the Governor-General makes references to the health services of French Equatorial Africa and to the difficulties they are compelled to face. The reduction in medical staff caused by the transfer of 30 medical men to the Fighting French forces or elsewhere has necessitated the closure of 15 medical posts. Difficulties of re-equipment of the existing services are becoming greater and war obligations such as the cultivation of cotton and the production of rubber have interfered with the prophylaxis of trypanosomiasis because of the concentrations of population they have entailed. Nevertheless the organization remains active and effective. C II

BRAHMACHARI (Upendranath) [Bt MA MD Ph D FRASB FNI Professor of Tropical Medicine Carmichael Medical College etc] *Gleanings from My Researches Vol I Kala Azar Its Chemotherapy*—pp vi+461 With numerous plates charts & diagrams 1940 Published by the University of Calcutta [30s]

In two volumes the author has gathered together a number of his published papers on the subject of kala azar and malaria and promises a third volume to include his papers on other subjects. His reason for reprinting the papers in book form is his desire to infuse the spirit of research into the minds of students of medicine in India and not least among those whose paths are restricted to institutions where proper facilities for research are not available.

The first volume contains a series of the author's papers on kala azar particularly with reference to the chemotherapy of the disease and the studies which culminated in the discovery of ureastibamine and the demonstration that it was at the time the best remedy for the treatment of this condition. There is no doubt that this drug though replaced by others which in the opinion of some observers are more certain and effective remedies has been responsible in India for the saving of thousands of lives. One of the papers is that which describes a new form of cutaneous leishmaniasis to which the author gave the name dermal leishmanoid. This condition had escaped notice but is now known to be quite common in India as a sequela of kala azar especially in treated cases which have been apparently cured of the visceral infection. Presumably leishmania have not been eradicated from the skin where in a year or two after the supposed cure of kala azar they produce a variety of cutaneous lesions. Another subject is that dealing with the precipitation of globulin from the serum of patients with kala azar when this is diluted with distilled water. From these observations the author elaborated his globulin opacity test for kala azar.

The papers reproduced in this volume have been reviewed from time to time in this *Bulletin* but their collection in one place will be of great convenience to those who are interested in the historical development of our knowledge of kala azar in India where the author has carried out all his investigations.

C M Henyon

WILSON (Charles Morrow) *Ambassadors in White The Story of American Tropical Medicine*—pp vi+372 With numerous illustrations 1942 New York Henry Holt & Company Inc [21s]

The subtitle of this book is *The Story of American Tropical Medicine* and to those who like history served to them in the form of the historical novel the work will be very acceptable for the main facts are accurate though the mode of expression and the way in which they are presented will often jar on the ears of the British reader. It will appeal to medical men as well as to the laity but rather to the latter for they will appreciate the familiar and chatty style of diction more than the former who are accustomed to look on medical history as a subject to be treated in a serious vein.

In despite of these and other blemishes the book has much of value and should be widely read because most of the facts are accurate and

clearly expressed. We do not know whether or not the author is a medical man. If he is not he has a wonderful flair for grasping the important alien points of a scientific investigation. If he is it is difficult to account for some glaring mistakes. Among the mistakes we note (p. 2) The doctor made the conventional blood test. The concentration of *Sporozoa plasmodiae* was frighteningly high. This is a new addition to the many synonyms of the malarial parasite. No medical man certainly none with knowledge of tropical medicine would report that he found the zygotes of malaria in the blood of virtually every child examined (p. 213). This peculiar statement concerning the presence of zygotes in a patient's peripheral blood occurs twice. Again (p. 19) the author speaks of Bubonic plague the louse carried nemesis of medieval Europe.

Nevertheless the book has much merit and is consequently deserving of a critical review and we pass on to deal with the individual chapters.

Chapter I gives a good general account of the difficulties to be overcome in achieving health in Latin America but overstatement detracts from rather than adds to the picture. The next chapter is interesting in telling of the rise of research institutions. Chapter III is mostly an account of Gorgas's achievements (enlarged upon later in Chapter VI giving his life story) and those of his fellow workers on the construction of the Panama Canal but there is too little mention of the opposition of the administration against which he had to contend in the earlier days of the undertaking. Chapter IV concerned in the main with the life of Carlos Finlay contains also discussion of epidemics of earlier centuries. It is gratifying to the reviewer who has repeatedly stressed the point to see that the author gives due recognition to Finlay for his primary and fundamental idea of the Tiger mosquito as transmitter of yellow fever on which the findings of the American Commission later were based. He states however that for purposes of immunization Finlay used inoculation of blister serum from an active case but makes no mention of his employing the more natural method of allowing infected mosquitoes to bite. Chapter V is a good life of Walter Reed interesting to doctor and layman alike but more perhaps to the latter because of its chatty style. The former would prefer a sober account of the facts and the facts are all there. The chapter shows lack of arrangement. It starts with a description of Reed's grave then of his work on typhoid fever and yellow fever and of the time when he was forty-nine. It then returns to his birth and records his life history. This is somewhat marred for British readers at least by trivialities.

There is a mistake on p. 102 that Ross in 1894 found in the Anopheles the unmistakable zygotes of malaria parasites. Mosquito Day the actual date of the discovery was August 20th 1897. Chapter VI contains the fascinating story of Gorgas's life. His death however occurred at the Army Hospital Millbank not Willbank as is stated twice. Next follows an account of Deeks's life work good and interesting but again somewhat spoiled by vulgarisms and hyperbole such as They shake with chills and fevers. They curl up with brun dlog. They rot with blackwater fever. Amoeba bugs play leap frog down their guts (p. 157). The life of Noguchi is very readable (Chapter VIII) but what may be called the terminal African period of his research life is rather slurred over—the reasons for his going to Africa his chagrin at the non acceptance of his *Leptospira icteroides* first by

The author has produced a considerable increase in our knowledge of these insects
P A Buxton

CANNON (D A) *Linguatulid Infestation of Man*—*Ann Trop Med & Parasit* 1942 Dec 31 Vol 36 No 4 pp 160-167 With 3 figs on 2 plates [36 rels]

The author reports on the colon of an African woman from Southern Nigeria. It was greatly enlarged and thick walled and studded with very great numbers of cysts of the Linguatulid *Armillsifer* (*Porocephalus*) *armillatus*. These were also present in great numbers throughout the thickness of the wall of the colon and in the mucosa. They had also been observed at post mortem though in lesser numbers at many sites under the visceral and parietal peritoneum. The patient had originally come into hospital complaining of alternating diarrhoea and constipation evidently caused by subacute obstruction due to this great load of parasites.

The very remarkable appearance of the specimen is shown in several photographs. The paper includes a full review of the occurrence of Linguatulidae in man.
P A Burton

BOOK REVIEWS

MANSON BARR (Philip) [CMG DSO MD FRCP (Lond)
Senior Physician to the Hospital for Tropical Diseases Royal Albert Dock & Tilbury Hospitals etc] *Synopsis of Tropical Medicine*—pp xii+224 With 5 plates 1943 London Toronto Bombay Melbourne & Sydney Cassell & Company Ltd 210 High Holborn WC1 [7s 6d]

Every medical man intending to practise his profession in the tropics takes with him one of the larger text books on tropical medicine and the majority decide on *Manson's Tropical Diseases* the most comprehensive work in a single volume hoping that someone else or the local medical library will have STITT's two-volume work. The editor of the former Sir Philip MANSON BARR has now written a *Synopsis of Tropical Medicine* which no medical man proceeding to the tropics can afford to leave behind. It is a veritable *plurimum in parvo* yet it will not materially add to his luggage because it can be slipped into the pocket. In fact it is best carried there for it is a *rade mecum* which must not be inadvertently overlooked when he goes on trek or has to travel light and leave the larger books behind. For purposes of pre-examination revision it is ideal.

It is difficult to avoid hyperbole in reviewing this work. Many synopses are so condensed that they become of little more interest than the dull reading of a catalogue—lists of causes symptoms diagnostic features and treatment. The book under review never falls to this level. The facts have been carefully marshalled and have been put together in a form eminently readable. The arrangement is orderly and sequential and the subjects dealt with so grouped as to

leave out no disease of importance. Protozoal spirochaetal rickettsial and bacterial diseases are considered in turn then virus diseases fungal infections nutritional and climatic diseases in this order and a short miscellaneous group of at present undiscovered causation. Vegetable and animal poisons are described interestingly and fully enough for general purposes. the final chapters except for a short concluding one on Laboratory Methods are concerned with metazoal infections chiefly helminthic. There are five plates well chosen for the importance of the subjects depicted namely the different malaria plasmodia intermediary hosts—mosquitoes flies ticks snails—human intestinal protozoa and the fifth of twenty two helminth ova drawn to scale.

There are a number of verbal slips as is almost inevitable in these days when few people can devote much time to proof reading but these do not detract from the medical value of the work for the facts themselves are all there and the verbal corrections can easily be made when the next edition is published. Little of importance has been omitted. Doctors going to the middle East might hope to find mention of Bejel puzzling cases of which may come their way no reference is made to the bone lesions of chronic melioidosis. Fontana's stain is mentioned more than once in the text as a means of diagnosis this might with advantage be given in the short section on Methods.

Just 2000 years ago Horace wrote *Brevis esse laboro obscurus fio* and there is always a risk of obscurity in striving after terseness. Generally speaking this Synopsis is clear and definite in its statements but occasionally we have been puzzled as to the meaning of a phrase or doubtful of its exact interpretation. For example *L. tropica* in numbers in macrophages of leucocytes beet (p 21) again Incubation period short 2-8 days after sexual contact prolonged to 12 weeks (p 9b) where the absence of a comma makes a lot of difference.

Cuticle with spines anterior (oral) median muscular ventral sucker former larger (p 161).

T.B. stands of course for the tubercle bacillus it is a pity to use the letters for the disease it sets up and may lead to confusion as in Differentiation [of Blastomycosis] from T.B. The mosquito *A. maculipennis* is said to be *androphilic* (p 11). This is an understatement for it is equally *gynaecophilic*. It is better to use the word *anthropophilic* which covers both. Kupffer (pp 5 15 166) has no modification solar (p 137) should be *solah* the hooklets of *Taenia solium* are described as *rose thorn* (p 196) whereas these are characteristic of *Dipylidium*. It is good to see *scolecex* spelt correctly.

The above are all comparatively small matters and do not seriously detract from the excellence of the work. The statements are dogmatic and rightly so when made by so eminent a specialist as the author. Attention may be drawn to specially useful points such as common mistakes in the diagnosis of liver abscess (p 39) the classification of the typhus fevers (pp 56 57) the schematic summary of the life history of *Strongyloides* (p 180) the rarity of *Diphyllbothrium* anaemia of which the text books usually make so much.

The format of the book leaves nothing to be desired. It is handy in size the print even the smallest is very clear and the Index full and complete. In conclusion the author has earned our thanks and is to be heartily congratulated on a difficult task well conceived and admirably executed.

H. Harold Scott

Agramonte later by workers in West Africa. Noguchi was undoubtedly a wonderful man with an exceptional brain but he was a bad loser and could not bear opposition.

Chapter IX is full of interest and offers information on many diseases among them smallpox, cholera, measles, typhus, whooping cough, tuberculosis, pneumonia, influenza, leprosy, dengue and dysentery and on obstetrics and water supplies all in 20 pages. Some of the *Fierce deep black mysteries* spoken of in Chapter X are mysteries no longer. Pinta for example is not a mysterious fungus disease the author writes. I have examined about twenty of the fungi which are causative agents. Pinta as was suggested many years ago has now been shown to be due to a spirochaete. Chagas's disease is said to be carried to man by mites, ticks, bedbugs and Triatoma and perhaps other vermin (p 234) whereas the vectors are some of the Reduviid bugs. It is true that four species of bedbugs and three ticks have been experimentally infected and the latter are capable of transmitting infection but proof has yet to be produced that they do so in nature. Again that American trypanosomiasis causes goitre is hardly any longer even problematical all the evidence goes to show that goitre is not an essential part of the disease. Yet again he says rat bite fever known principally in the West Indies (p 235). The chief country of rat bite fever is Japan where it is known as sodoku (so=rat doku=potion) it is a rarity in the West Indies. The author speaks of research among the mycoetes and phytoses? The last is a new word to the reviewer can he mean laborious and painful. We cannot understand the grounds for such a statement. On the contrary in the vast majority of cases nothing is more dramatic than the results of treatment. Lesions may clear entirely within a fortnight and on an average three injections of the appropriate arsenical will bring about cure and in half the cases permanent cure. Sprue he says is the result of lowered vitality, disordered digestion, constipation or diarrhoea, sallow complexion, lowered blood pressure, persistent loss of weight and according to autopsy of diminution in the size of the liver. If the wording is not faulty the statement is. Sprue is certainly not the result of lowered blood pressure and diminution in the size of the liver. Under pellagra no mention is made of the work of SPIES probably the greatest authority on this disease in America or elsewhere. The title of this chapter is not well chosen for of the diseases mentioned and discussed in it typhus, Chagas's disease, filariasis, dysentery, ankylostomiasis and tuberculosis can hardly be regarded as deep black mysteries. Of leprosy it is stated: Vaccines are proving at least partially effective. Chaulmoogra and its derivatives receive no mention. Chapter XI is good and well up to date even to mentioning *Anopheles bellator* which United States Army medical officers have comparatively recently shown to be an effective transmitter of malaria. More might be said on species sanitation and engineering projects, canalization and drainage in prevention.

In a serious work on the history of tropical medicine to find a chapter entitled *Damn the Mosquitoes* brings one up with a jerk. Chapter XII relates the story of the United Fruit Company and its medical activities and a fascinating story it is. The penultimate chapter touches upon a variety of subjects and incidentally contains several mistakes. The Nubian mountains (p 301) doubtless mean the Nuba

Mountains in the Sudan where there was recently so serious an outbreak of yellow fever. On the same page we find: During the First World War era yellow fever flared up fiercely in Suez, Mesopotamia and Iraq and fourteen species [of mosquito] actually carry yellow fever. comment on these dicta are needless for those with knowledge of tropical medicine. Again blackwater fever a malady which ravages liver and bladder cells (p 305) one third to two-thirds of all native people carry malaria zygotes in their blood streams (p 306). The old story now known to be a fable of the Countess of Chinchon is repeated as if it were factual. The history of Cinchona is much more interesting and even romantic than the author's bald version. The final chapter is political.

In a work on American tropical medicine we are surprised to find no mention of the epic struggles of those engaged in solving the problem of Rocky Mountain fever nor of the work of Alice Evans on *Brucella abortus*.

There is a bibliography with a few references for each chapter and four appendices. The first is of acknowledgments but only to American sources of information. the second is another bibliography of 149 general references. the third is a chronological list of some of the more important Latin American epidemics with suggested places of origin. the fourth quotes certain population returns for various years from 1585 to the present. The earlier figures can only be pure guesswork.

We have dealt fully with this work because if allowance is made for the slips alluded to the book is instructive and full of interest. The author writes in the opening chapter that this book attempts to tell the story of the men in white who have been our best ambassadors of goodwill to countries where most men are sick and where most sick people are without hope and he has carried out his purpose conscientiously. The book is well got up, the print is clear, misprints are few, illustrations appropriate and photographs well reproduced. We wish it all the success it merits.

H. Harold Scott

We record with great regret the death on April 24th 1943 of Professor WARRINGTON YORKE MD FRCP IRS. Professor Yorke was a Sectional Editor of the *Tropical Diseases Bulletin* from 1912 to the time of his death.

TROPICAL DISEASES BULLETIN

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[No 6

SUMMARY OF RECENT ABSTRACTS *

V LEISHMANIASIS

VISCERAL

Epidemiology Aetiology

According to GELDRICH (p 673) the infantile form of kala azar occurs in the Mediterranean countries but is practically confined to coastal regions. He now reports the first case of this form in Hungary and gives details of its successful treatment with neostibosan. McCLELLAND (p 167) notes that kala azar is endemic in the Province of Hupeh north west of Hankow. MARTÍNEZ NIOCHET and PONS (p 607) report the first autochthonous case of kala azar in Venezuela. SENEJJI and ZEBOUNI (p 167) have studied the biochemical reactions of leishmania. All forms are aerobic there is no evidence of fermentation of sugars or of production of indole they are killed at once by heating to 45 C. It is claimed that *L. brasiliensis* the parasite associated with American mucocutaneous leishmaniasis is so resistant to bile that 30 per cent of the leptomonads are alive after 7 days whereas *L. infantum* and *L. caninum* are quickly dissolved.

Transmission Animal Reservoirs

SMITH HALDER and AHMED (p 447) note that blocked sandflies are found only in those batches which are allowed to feed on raisins after their infective blood meal. Flies given repeated blood meals without raisins did not become blocked. After blockage most of the flies died within 48 hours. The same authors (p 449) found that infected flies maintained on raisins induced infection when subsequently fed on five hamsters but that infected flies maintained on repeated blood meals failed to do so. It seems therefore that the method of maintaining the flies is the important factor. [For an account of the earlier work by these authors on blocked sandflies and the transmission of kala azar see this *Bulletin* 1942 Vol 39 p 361.]

The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Topical Diseases Bulletin* 1942 Vol 39. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

[Jun 1943]

Although *P. chiroensis* has been found in parts of N. China in which kala azar is unknown and although kala azar may be seen where *P. chiroensis* has not so far been found YAO and WU (p 449) consider that the association of this sandfly and the disease is in general so close that where the one is found the other will ultimately be discovered. They record the infection of hamsters by inoculation of flagellates from these flies. CHENG and FENG (p 169) in Peiping found flagellates in sandflies (*P. chiroensis*) captured in a kennel in which was kept a dog suffering from leishmaniasis. Inoculation of flagellates from the flies into a hamster produced the disease. PANDE (p 537) describes a natural leishmanial skin infection of a bullock in Assam. Since oriental sore does not occur in Assam whereas kala azar is common the author favours the view that the parasite found was *L. donovani* and that the case was one of kala azar with skin lesions.

The view has been expressed that in dogs with kala azar it is the kin rather than the internal organs which is primarily affected but HO CHENG and YU (p 169) have noted that when parasites are found in the kin they are also present in the organs and they have traced the course of infection in two dogs in which leishmania were found in bone marrow. The kin becoming infected at a later stage only. TORRES (p 169) has studied the pathology of the skin in dogs affected with kala azar in S. America. Histiocytes containing the parasites accumulate and may form nodules and ulceration of the kin may result from folliculitis. The skin lymphatics and the intercellular spaces contain cells infected with leishmania and these cells are available to the intermediate host. IER (p 168) discusses the formol-gel reaction in canine leishmaniasis. If the reaction is slow the animals generally improve with treatment if it is prompt they usually fail to respond. If the test does not become negative with treatment relapses may be expected. STEIN and WERTHEIMER (p 47) in Palestine have noted that a precipitate forms in the serum of dogs suffering from kala azar if it is kept at 5°C and that the precipitate redissolves on reheating the serum to 37°C. The fraction concerned is known as the cold fraction but there is another fraction which is precipitated on dilution and a third which is precipitated by 11 per cent sodium sulphate.

Clinical Findings Talmert

From a study of kala azar and malaria in a district in which both were prevalent SMITH and AHMED (p 448) do not support the view which had previously been put forward that kala azar suppresses malarial infection by virtue of the histiocytosis of the former disease. There is still some circumstantial evidence but little direct evidence that malaria may predispose to kala azar. With regard to prevention the authors note that measures against the adult vectors of these diseases all of which take shelter in houses may be more effective than measures against the larval stages which are found in totally different environments. ALBA (p 649) notes that in the Sudan visceral cutaneous and oral leishmaniasis may exist side by side. There is difficulty in deciding whether ulcers are oriental sores or cutaneous complications of kala azar but the author limits the diagnosis of oriental sore to those cases in which there is no fever or evidence of visceral or oral infection.

Purely cutaneous infections may be ulcers or nodules and cutaneous manifestations of visceral disease may ulcerate in untreated cases or may be non ulcerating lesions following successful treatment of the visceral infection

COLE *et al* (p 746) describe an outbreak of kala azar in a native battalion near Lake Rudolph in Kenya Leishmania were found in only 22 of the 31 cases and of the positive cases 14 proved fatal The examinations performed included —spleen smears 11 (7 positive) liver smears 6 (4 positive) bone marrow smears 8 (1 positive) gland smears 3 (2 positive) Blood culture failed in 10 trials Treatment with intravenous tartar emetic (the only antimonial available) was not very successful though it served to bring down the temperature The evidence of cure in those discharged was not very convincing TOBIAS (p 608) failed to find leishmania by gland puncture in 20 cases of kala azar in native soldiers stationed in Abyssinia sternal puncture was positive in 1 of 12 and spleen puncture in 8 of 17 The cases were acute or subacute and the author describes two of fatal agranulocytosis

ADLER (p 607) points out that if Mediterranean kala azar cannot be diagnosed by ordinary methods culture of the juice of any punctured organ should be attempted and positive results are readily achieved in infected persons This method should be adopted as a routine [It would seem desirable to try this method in the Sudan where as shown above diagnosis may be difficult]

CHUNG and LU (p 168) have found a complement fixation reaction in which antigens prepared from the spleens or livers of moles and hamsters infected with *L. donovani* or *L. caninum* were used to have a definite value in the diagnosis of kala azar The results indicate that the two parasites are closely related or identical and suggest that in China the human and canine diseases are caused by the same parasite JIMÉNEZ DIAZ and CASTRO MENDOZA (p 170) have found low values in kala azar for the lipid and cholesterol content of the blood and diminished esterification of the free cholesterol comparable with that which obtained in severe hepatic insufficiency They suggest that the flocculation phenomena characteristic of the serum in kala azar are probably the result of the diminished amount of cholesterol esters

NAPIER *et al* (p 171) report for the first time a case of post kala azar dermal leishmaniasis in which the cornea was affected Considerable improvement in vision and resolution of skin and corneal lesions took place after treatment with potassium iodide and organic antimonials It is noted that one quarter of the patients with post kala azar dermal leishmaniasis in Bengal give no history of treatment for kala azar

SOONG and ANDERSON (p 171) discuss the evaluation of drugs in experimental leishmaniasis They obtained good results in a series of infected hamsters by injecting one tenth of the L_{50} dose subcutaneously three times each week until a total quantity equal to the L_{100} dose had been given For neostibosan this total was 4 gm and that the evaluation of ureastibamine is unsatisfactory because its antimony content varies between 20 and 43 per cent There is no rapid method for determining the value of any drug and careful pharmacological investigation is necessary KIKUTH and SCHMIDT (p 450) have carried out therapeutic trials in animals which indicate that in kala azar equal doses and courses

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of solustibosan and neostibosan produce equal results though solustibosan contains considerably less antimony than does neostibosan. Solustibosan is better tolerated by the animals and in intensive treatment gives at least as good results as neostibosan.

SATI (p 47) has experienced a 20-7 per cent. mortality in a large series of cases treated with antimony compounds in the Sudan. This is a high death rate than is seen in India, but it cannot be said that antimony treatment is a failure. A combination of drugs gives better results than the use of one alone. The treatment should be started as early as possible. The author notes that gland puncture has been facilitated in the disease as the parasites begin to die. The discovery of the parasites in the disease as possible. The author notes that gland puncture has been facilitated in the disease as the parasites begin to die.

BRAMACHARI (p 237) describes a new antimonial neostibosan which promises well for the intramuscular treatment of kala azar. It contains 41 per cent. of antimony.

ADLER and TCHERNOLORETZ (p 48) report on the action of various aromatic diamidines in experimental kala azar (*L. donovani* and *L. infantum*). Propamidine (4,4-diamidino diphenyl propane) is as effective as stilbamidine (4,4-diamidino stilbene) in light infections but not so good in heavy infections. The same authors (p 173) found that 4,4-diamidino stilbene in doses of 1 to 40 mgm. per kilo body weight has a definite therapeutic action on hamsters infected with *L. infantum* and *L. donovani* but that infections due to *L. donovani* were more resistant than those due to *L. infantum*. This is in line with the fact that in man Mediterranean kala azar requires at least three times as much ureastibamine or neostibosan as the Indian disease to effect cure.

WINGFIELD (p 172) treated an Indian patient suffering from kala azar with 4,4-diamidino stilbene in doses of 40 mgm. given daily by the intravenous route for 10 days. This course of treatment was repeated and after the end of the second course the patient was apparently cured. Faintness, breathlessness and headache were noted after the injection, but these could be avoided by giving the injections slowly. Blood pressure fell after the drug was given and fell the level of blood sugar. It is suggested that the drug may exert an effect antagonistic to that of adrenalin [see ADLER and GUPTA below].

ADLER (p 172) reports a case of kala azar in an Indian in which great improvement followed 8 daily intravenous injections of 4,4-diamidino diphenyl pentane in individual doses of 2 mgm. per kilo body weight. The fall in blood pressure immediately after each injection was considerable but return to normal took place in 10 minutes. A similar fall was observed after intramuscular injection of 4,4-diamidino diphenyl pentane. The dosage was 100 and 800 mgm. in 66 and 72 injections respectively. The spread over a period of 3 months associated with various unpleasant symptoms which takes place during the intravenous injection of 4,4-diamidino diphenyl pentane and which usually passes on quickly. If the blood pressure fails to return quickly to normal an injection of adrenalin restores it almost immediately. In four cases anaesthesia to light touch over the triangular area developed some months after treatment but showed a tendency towards spontaneous cure.

ADLER and GUPTA (p 48) refer to the marked fall in blood pressure associated with various unpleasant symptoms which takes place during the intravenous injection of 4,4-diamidino diphenyl pentane and which usually passes on quickly. If the blood pressure fails to return quickly to normal an injection of adrenalin restores it almost immediately. In four cases anaesthesia to light touch over the triangular area developed some months after treatment but showed a tendency towards spontaneous cure.

CUTANEOUS (ORIENTAL SORE)

SHAH (p 173) gives an account of an outbreak of oriental sore in Delhi where *Phlebotomus sergenti* is prevalent. Examination of the sandflies revealed a proportion infected with flagellates which were regarded as developmental forms of *Leishmania tropica*. Widespread infection was found in the population of a rocky ridge in the area and it was estimated that almost 20 000 cases occurred in 1939-40. Diagnostic methods included the finding of leishmania and a skin test involving the intradermal injection of leishmin, presumably an antigen prepared from cultures of the parasite. To this test 75 of 76 affected boys were positive. The sores were characteristic. The treatment of choice consisted of scraping and dressing with tannic acid powder or magnesium sulphate paste. Tartar emetic ointment (4 per cent) was useful but injection of trivalent or pentavalent antimony compounds is the only specific. No single treatment can be expected to cure all cases.

In the Report for 1938-39 of the All Union Institute of Experimental Medicine U.S.S.R. (p 538) it is recorded that experiments have indicated that the gerbil *Rhombomys opimus* is the principal source of human cutaneous leishmaniasis. Up to 60 per cent of these rodents are naturally infected in Turkmenistan and the identity of the gerbil and human parasites was established by cross infections. Spontaneous infections were also found in two other species of gerbils and a marmot. Sandflies captured in rodent burrows proved to be infected with leishmanoid forms to the extent of 35 per cent. Additional proof of the view that human disease originates from rodents is afforded by the fact that destruction of rodents in their burrows was followed by a decreased incidence of human infection from 70 to 0.4 per cent.

ADLER and BER (pp 174-451) have succeeded in inducing in man oriental sore from the bites of *P. papatasi* infected with *L. tropica* by feeding through a membrane on a suspension of washed flagellates. The flagellates were in a medium consisting of three parts of 2.7 per cent saline and one part of inactivated defibrinated rabbit blood. The flies after feeding were maintained at 30 C and were allowed subsequently to feed from time to time on a person who had recovered from oriental sore. They were then allowed to bite five volunteers, each of whom became infected. [It is interesting to compare these procedures and results with those of SMITH *et al.* (above) in Kalahazar.] The authors suggest that the ease with which transmission was effected in this work may perhaps be related to the temperature of maintenance and to the high salt content of the flagellate medium. They refer to an outbreak of oriental sore in a Dead Sea area where the soil had a high saline content and to the fact that the disease is rarely seen a short distance away where the salinity is lower.

KATZENELLENBOGEN (p 750) refers to the prevalence of oriental sore in persons settled near the Dead Sea in Palestine. He attempted vaccination with flagellates from culture or with leishmania from the spleens of infected hamsters. Sores developed at the point of inoculation except in persons with a history of past infection or who had long resided in the area. In one year over 100 cases of oriental sore occurred in unvaccinated persons but none in the vaccinated.

SENERJI (p 174) shows that from *L. tropica* can be obtained a flagellar and a somatic antigen, further an S (polysaccharide) and an H fraction can be separated. Non immune persons do not react to

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injection of these fractions or of whole leptomonads but persons suffering from oriental sore give allergic reactions to each which reach maximum in 24 hours. In persons recovered from oriental sore reaction to the S fraction is not constant but that to whole leptomonads is definite.

DOSTROVSKI and SAGHER (p 749) report favourably on the effect of infra roentgen rays (grenz rays) on oriental sores and nodular lesions. Details of dosage are given.

HRAD (p 609) reports a case of nodular skin leishmaniasis which had apparently persisted for 11 years. Cure was effected by means of electro-coagulation.

MILCO CUTANEOUS (AMERICAN)

PESSÓA (p 175) considers that in the State of Sao Paulo Brazil man is the reservoir of cutaneous leishmaniasis. No evidence is available to incriminate the dog. In prevention it is not possible to adopt measures against sandflies since knowledge of the actual vectors and their habits is lacking. A method of vaccination with cultures of *L. brasiliensis* has been tried and there is some evidence that an appreciable degree of protection may be conferred. Treatment is useful in controlling spread of infection. The drugs advocated include tartar emetic, fovadin and anthomaline while atabrin may be injected round the lesions.

The same author (p 673) notes that in the areas of high endemicity of Sao Paulo Brazil cutaneous leishmaniasis occurs chiefly in persons who give a history of 6-12 months residence. Infants are especially liable. Although new cases may be found throughout the year the maximum incidence is in autumn and the prevalence of the disease bears a definite relationship to the density of the sandy population and also to their predilection to attack man and to atmospheric temperature and humidity. Cure is spontaneous in 7 per cent of cases. In patients who have had cutaneous lesions for a year or more some involvement of the nasal mucosa is found in 80 per cent.

REY MATIZ (p 174) reports that cutaneous lesions are widespread in Colombia and that material from human sores produced lesions when injected into the dog and the agouti.

PESSÓA and COURTIGNO (p 175) found leptomonad infection in 0.23 per cent of species of *Phlebotomus* in a part of Brazil in which the incidence of cutaneous leishmaniasis is high. Other biting insects were not infected. PESSÓA and PESTANA (p 610) report leptomonads which were identified as *L. brasiliensis* in *Phlebotomus migonei* in Brazil. COURTIGNO (p 610) found leptomonad in dissected *P. p. oai* in the same area.

PESSÓA and PESTANA (p 609) describe as the primary lesion of American cutaneous leishmaniasis papular elevations of the skin impetiginous foci or fissures on the lips.

VILLELA *et al* (p 610) have found leishmania in the apparently normal mucous membrane of the nose in patients with cutaneous leishmaniasis. They conclude therefore that in this form of the disease treatment should include the use not only of antimonials but also of eparseno which is they claim the only drug which acts on leishmania infection of mucous membranes. Eparseno is an ars phenamine solution ready for injection. [See this Bulletin 1933 Vol 30 p 33, 1940 Vol 37 p 33.]

The Montenegro skin test is performed by injecting intradermally an antigen consisting of a phenolized suspension of cultural forms of *L. brasiliensis* in positive cases there develops during the course of 48 hours a specific papule which persists 4 or 5 days. PESSÔA and PESTANA (p 673) report that it is a group reaction since positive results are given with antigens from other species of *Leishmania* and with *Trypanosoma cruzi*. In some cases of leishmaniasis the result may be negative and positive reactions may be seen in other infections the test therefore should always be controlled by careful clinical observation. It is however held to be the best method for detecting infection in the course of a survey. ARANTES (p 170) however claims that the test is so specific that it is a useful aid in the diagnosis of leishmaniasis but he admits that in some cases of glandular tuberculosis a positive result has been obtained. He tested the reaction in 140 lepers and found no positive results unless there had been previous leishmaniasis the leprotic state did not modify the reaction which was positive in some cases in which recovery from the leishmania infection had taken place twenty years before.

PESSÔA and PESTANA (p 674) have used a vaccine prepared from cultures of the leishmania of cutaneous leishmaniasis in Brazil for the inoculation of a group of people. In the 4 months following vaccination the incidence of the disease in the vaccinated group was 1 per cent in a control group 8 per cent. The authors regard this result as encouraging and propose to continue the method perhaps with an improved vaccine.

DO AMARAL (p 175) has subjected cultures of *L. brasiliensis* to low temperatures and notes some loss of vitality which is restored on return to 23 C. Cultures grow best at 20 to 28 C.

Charles W. H. Wilcocks

MALARIA

PAMPANA (E) La malaria in Grecia [Malaria in Greece]—Riv. di Malariologia Sez I 1941 Vol 20 p 187 [Abstr (by WEYER) in Deut Trop Ztschr 1941 Aug 1 Vol 45 No 15 pp 457-459 With 1 map]

This is a short critical review of malaria in Greece with special reference to recent research which has been greatly developed during the past ten years with the help of the Rockefeller Foundation. Greece especially Epirus is regarded as being more heavily infected than any other European country. The Ionian and Aegean islands show the lowest incidence. The spleen indices in children of 5 to 15 according to the latest surveys were —Greece as a whole 35.6 per cent Macedonia and Thrace 37.9 Epirus 49.9 Peloponnesus 39.2 Crete 40.3 the Ionian islands 18.5 and the Cyclades 17.1. The death rate from malaria from 1925 to 1929 was estimated to be 1.024 per mille against 0.067 for Italy in 1929. Of the deaths from all causes from 1921 to 1925 5.6 per cent were due to the disease. Blackwater fever is very common. The disease is almost universally endemic even in cities like Athens and Salonica and in addition there are severe epidemics from time to time these depend on weather conditions. Heavy rain causes flooding and the formation of pools in the estuaries of rivers

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such as the Vardar, Struma, Langa and Pinos. Heavy rainfall in the early part of the year is followed by summer epidemics. Dry weather in February and through the summer justifies a forecast of low incidence. The latest severe epidemics were in 1931 and 1933. In these years half of the cases in summer were due to *P. falciparum* infections and more than half in autumn. The rest were due to *P. vivax*. *P. malariae* was almost entirely absent. In years of endemicity (1933 and 1934) the infections were *P. falciparum* 38 per cent. *P. vivax* 24 per cent. and *P. malariae* 31 per cent.



In the past ten years some severe epidemics were associated with movements of population due to war and other causes. The first cases of fresh infection appear in late May or early June so that quinine prophylaxis must be started early in May. Malaria in general reaches its height in early August and remains at a high level till October. *P. vivax* infections reach their peak in August, those due to *P. falciparum* in October. Infected *Anopheles* are first found towards the end of May of the eight species found in Greece the only ones of practical importance are *A. maculipennis* (var. *typicus* and *messeeae*) *A. sacharovi* (*clutus*) and *A. superpictus*. Breeding of *A. sacharovi* begins as early as April and is at its height in June and July when *A. maculipennis* also is most numerous. *A. superpictus* first comes into evidence in June, infected females are first found in July and are most numerous in August and September. In Macedonia in September the sporozoite index was 3.8 per cent for *A. sacharovi* in August it was 3.1 per cent for *A. superpictus* and in July 0.5 per cent for *A. maculipennis*. The breeding places of the important vectors are fairly well known. *A. superpictus* breeds in open and rather shallow water in the margins of hill streams in streams with sandy bottoms and in hill rivulets. *A. sacharovi* and *A. superpictus* have an extreme range of flight of at least 5 kilometres. Individually *A. superpictus* is a more effective vector than the others but *A. sacharovi* assumes importance because of its predilection for human blood of specimens caught in living rooms in Macedonia 61.0 per cent had fed on human beings of those caught in cattle stalls 7.5 per cent. For *A. superpictus* the corresponding figures were 29.7 and 1.6 per cent and for *A. maculipennis* 21.1 and 0.5 per cent. It is still a matter of doubt whether *A. superpictus* or *A. sacharovi* is the more important vector the latter is regarded as the chief vector in Macedonia but in other localities which have been less thoroughly surveyed the former may sometimes be the usual vector.

The last section of the paper deals with the energetic measures of control that have been carried out in certain areas, the history of malaria in Greece and the influence on the disease of war with movements of troops and civilians. Care must be taken to employ proper preventive measures so as to avoid the ravages caused by the disease in the last war.

The map shows the spleen and parasite indexes based on a survey of school children in 1933-34 in 97 localities including a number of large towns.

John H. D. Megaw

PAMPANA (E) La malaria nella ex Jugoslavia [Malaria in Yugoslavia]—*Riv. di Malarologia* Sez. I 1941 Vol. 20 p. 205 [Abstr. (by WEYER) in *Deut. Trop. Ztschr.* 1941 Aug. 1 Vol. 45 No. 15 pp. 459-460]

The whole of Yugoslavia is malarious with the exception of some places at high altitudes and a few islands off the Dalmatian coast. The highest incidence is in South Serbia and the Danubian plain including Belgrade and Dalmatia. In Croatia the valleys of the rivers Mur and Drave are the most malarious regions. In a population of 14 million in 1929 the notified cases were about 600,000 but the real number must have been considerably higher. The vectors concerned were the same as in Greece. *Anopheles superpictus* was especially abundant in central and southern Dalmatia and the coastal region of Montenegro.

All varieties of *A. maculipennis* were found *labbranchiae* in northern and central Dalmatia *atroparvus* was seldom found *subalpini* was occasionally observed *typicus* and *messeae* were frequent. The last two were found to be locally associated with transmission first in uplands then in the valleys and plains. *A. maculipennis* and *A. sacharovi* are the chief vectors of spring and summer infections by *P. tinax*. *A. superpictus* probably plays the chief part in the autumn transmission of *P. falciparum*. In southern Serbia the first observed breeding was in the second half of April further south it was a fortnight earlier. *A. maculipennis* reached its greatest numbers in the second half of July. Eggs of *A. superpictus* begin to be laid early in April but the first brood is destroyed by the heavy April rains. It becomes most abundant in August when the streams carry little water, the lower the rainfall from June to September the better are conditions for breeding. The multiplication of *A. maculipennis* is promoted by heavy falls of snow in winter and of rain in spring. The period of transmission has an early peak in April and May and a second higher rise in August and September. The curve of *P. falciparum* shows only one peak in September and October. In Dalmatia at one time 150 000 cases were estimated to have occurred in a population of about 600 000 but conditions have probably improved considerably since that time. The chief breeding grounds here are in rain water cisterns. The islands Veglia Pogo and Arbe off the Dalmatian coast were formerly infected. In South Serbia there is malaria in the plains as well as in the hills. In the years 1928-32 in one locality 66 per cent of the cases were due to *P. tinax*, 31 per cent to *P. falciparum* and 3 per cent to *P. malariae*. *P. falciparum* infection occurs chiefly in persons over twenty years old. The highest parasite and spleen rates are in children of one to five years. Prevention consists chiefly in the establishment of stations for research and control, the conversion of cisterns to mosquito proof reservoirs and efforts at larval control in the valleys. Excellent results followed the introduction of *Gambusia* in the Dalmatian coastal areas and islands.

John H. D. Me au

COLLIGNON (E) La campagne antipaludique de 1941 dans le département d'Alger [Antimalaria Campaign of 1941 in the Department of Algiers]—*Arch. Inst. Pasteur d'Algérie* 1942 June Vol 20 No 2 pp 147-161 With 4 figs on 2 plates & 2 graphs

Deficient rainfall characterized 1941 in the Department of Algiers as it did the previous year. The late autumn rains of 1940 were rapidly absorbed by the dry earth and in the ensuing winter the precipitation was below the average. As a result there was almost a complete absence of the usually numerous small spring time mosquito breeding places and even many of the small marshes and small water courses that usually hold water throughout the spring were dried up at the end of winter. As a result malaria prevalence was low. *P. tinax* infection were most in evidence. *P. falciparum* infections were much less numerous than usual. *A. bifurcatus* and *A. algeriensis* larvae were first found on 15th March. *A. maculipennis* larvae a week later. *A. hispaniola* larvae were not found till the 12th June. *A. maculipennis* is the most prevalent anopheline. Adult *Anopheles* were most numerous from April to July. An abnormally warm autumn extended the usual season of prevalence. They were fairly numerous in the first

half of November Prophylactic medication was used in some areas and *Gambusia* as in past years was found to be of great value in a variety of permanent mosquito breeding places *Gambusia* flourishes in Algeria. The spleen indices show little change as compared with previous years. These at the beginning and the close of the malaria season were coastal districts 26 and 26 interior districts 33 and 19 for the whole department 28 and 25 per cent

ORTEGA (Francisco) *Campana antipaludica de 1942* Antimalaria Campaign in 1942]—*Rev Med Quirurg de Oriente* Santiago de Cuba 1942 Sept Vol 3 No 3 pp 162-172 With 1 fig

There was a sharp outbreak of malaria in Santiago de Cuba during the last two months of 1940 and the first 3 months of 1941 known cases totalled 664 and there were 31 deaths ascribed to malaria. There was a very low incidence of the disease in April and May 1941 and all special measures except for a certain amount of permanent drainage work were suspended. During the last six months of 1941 however the malaria mortality of the city was unduly high averaging 10 deaths a month. The present report is mainly concerned with the epidemic outbreak that followed in the spring of 1942 and the measures that were taken to combat it. During February March and April 1942 478 cases were reported 16 of which terminated fatally. Of the 220 positive blood films that were examined *P falciparum* was found in 217 *I. mix* in 3. Some information is given of the anopheline breeding places but nothing is said of the species of *Anopheles* responsible for the outbreak. Cases were treated almost exclusively with quinine oiling was the antilarval measure employed. Much of the report including recommendations for the future based on the experience gained is of local interest only

Norman White

LIEBAUD (Castulo) *Contribucion al estudio de las formas clinicas del paludismo* (Contribution to the Study of Clinical Manifestations of Malaria)]—*Rev Med Quirurg de Oriente* Santiago de Cuba 1942 June Vol 3 No 2 pp 73-77

To illustrate the protean clinical manifestations of malaria the author gives notes of ten of the most interesting cases of malaria he has had in his ward of the Saturnino Lora General Hospital during recent years. The forms of the disease illustrated are epileptiform dysenteric cerebral blackwater and rheumatic. There was a case in which miscarriage was caused by malaria a case in which the symptoms simulated appendicitis and a case in which the intense anaemia was due to the association of malaria parasites with *Necator* infection. It seems remarkable that so many relatively rare manifestations of malaria should be reported from the Oriente Province of Cuba where malaria endemicity is low [this *Bulletin* 1940 Vol 37 p 664]

Norman White

DJAPARIDZE (P S) *Immunity in Malaria based on Materials from the Endemic Regions of Abkhazia ASSR*—*Med Parasit & Parasitic Dis* Moscow 1942 Vol 11 No 3 pp 3-11 [In Russian]

The data on immunity in malaria described in this paper are based on mass observations conducted in the course of two years (1927-8) in the Abkhazian Republic [Black Sea coast of Caucasus] where the three main species of parasites occur. The task was facilitated by

the fact that in one of the districts (Gal) no antimalarial measures whatever had been undertaken the disease was hyperendemic and its course could be observed in its pure form. The conditions in the Gal district are compared with those in Gudaut district which was characterized by epidemic outbreaks with a low general incidence of malaria.

It was found that the population of the hyperendemic region having been repeatedly exposed to seasonal infections in the course of 4-5 months from year to year had developed a relative immunity [premunition] which is strictly strain-specific. The parasite rate reaches its maximum at the age of 5 after which it gradually decreases until by the age of 40 it is halved. The spleen rate is highest between the ages of 6 and 10 diminishing slightly after the age of 20. When both benign and malignant tertian malaria are present the population acquires a more stable immunity against the former. On account of this in hyperendemic localities the incidence of *P. vivax* in the blood decreases with the age of the patients and conversely the predominance of *P. falciparum* rises with their age.

The immune state of the adult population in the hyperendemic region was reflected (1) in the absence of severe clinical forms of malaria (including comatose cases) and (2) in the presence of infected persons showing no symptoms at all. Immunity observed in Abkhazia appears to be of the same type as that recorded for natives of tropical countries (premunition) though the resistance to infection is less pronounced in the Caucasians.

C. A. Hoare

WILCOX (Aimee) Manual for the Microscopical Diagnosis of Malaria in Man—Nat. Inst. Health Bull. No. 160 Wash. pp. ix+39
With 13 plates (6 coloured) [33 refs.]

In this manual of 39 pages of text illustrated with 13 plates of coloured drawings from thin and thick blood films and microphotographs the diagnosis of malaria by microscopic examination of the blood is fully discussed. Special importance is attached to the thick film but it is emphasized that a knowledge of the appearance of malarial parasites in thin films is a first essential if the identification of parasites in thick films is to be successfully accomplished. A clear account is given of the method of preparation of thin and thick films and of their staining—by Wright or Leishman stain for thin films and by dilute Giemsa stain or a mixture of dilute Giemsa and Wright stain for thick films. The morphology of the three common malarial parasites is carefully described and illustrated in three excellent coloured plates. This is followed by an account of the appearances of these parasites in workers whose duty it is to examine blood for evidence of malarial infections and as stated in the Foreword by M. A. BARBER (who has had an unrivalled experience in the examination of blood films for malarial parasites) the publication is a clear thorough and timely treatment of an important subject.

C. M. Henry

SIERRA LEONE MEDICAL DEPARTMENT A Blood Staining Technique for Malaria [Technique adopted in June 1940 by Drs A. J. WALKER & T. H. DAVEY at the Sir Alfred Jones Research Laboratory, Freetown] 3 pp.

The main interest of this pamphlet is that it describes a modification of the now well known method of FIELD for staining thick blood films.

for malarial parasites [this *Bulletin* 1940 Vol 37 pp 808-874]. The thick film is first immersed for one second in the methylene blue solution diluted one in four with distilled water washed in tap water and then stained for ten minutes in diluted Giemsa stain rinsed in tap water and allowed to drain and dry. There are useful hints in the pamphlet but some confusion detracts from its value. If properly revised it might serve a useful purpose. C M Wenyon

CHABELARD (R) La diagnose différentielle entre *Anopheles hispaniola* et *Anopheles sergenti* [Differentiation between *A. hispaniola* and *A. sergenti*].—*Arch Inst Pasteur d'Algérie* 1942 June Vol 20 No 2 pp 139-146 With 4 figs

SERGEANT (Etienne) De quelques caractères différentiels des larves d'*Anopheles maculipennis* var *atroparvus* du Limousin et var *labranchiae* du littoral algérois [Differentiation of larvae of *A. m. atroparvus* and *labranchiae* in Algeria].—*Arch Inst Pasteur d'Algérie* 1940 June Vol 18 No 2 pp 16-220 With 2 figs

GORITZKAYA (V V) Valeur épidémiologique de femelles printanières de l'*Anopheles maculipennis* Meig dans les conditions de la région de Dniepropétrovsk [Epidemiological Importance of Overwintering *A. maculipennis* in the Region of Dniepropetrovsk].—*Med Parasit & Parasitic Dis* Moscow 1940 Vol 9 No 5 pp 500-502 With 2 graphs [In Russian] [Summary taken from *Rev Applied Entom* Ser B 1943 Feb Vol 31 Pt 2 p 24]

Observations during eight years in the Province of Dniepropetrovsk showed that some of the overwintered females of *Anopheles maculipennis* Mg abandon their hibernation quarters in the first half of March and some in late March or early April their appearance almost coinciding with the beginning of the spring outbreak of malaria which is due to relapses and occurs in April-May. The mean April temperature (8.5°C [47.3°F]) is however too low for the completion of development of the malaria parasite in the mosquitos even if some enter warm buildings and become infected they soon fly out to oviposit in the open. It appears therefore that mosquitos that become infected after they have left their hibernation quarters cannot transmit malaria until May when the temperature becomes favourable. To ascertain whether overwintered females can survive until then individuals taken between 21st March and 30th May including some of the first generation which emerged between 17th and 19th May were dissected and their oviducts were measured. The measurements showed that a small proportion of the mosquitos taken late in May had oviposited and so must have belonged to the overwintered generation since the first generation females could not have matured their eggs before 30th May. It appears therefore that some of the overwintered mosquitos live until the end of May and possibly the beginning of June though most of them die earlier. The first infected mosquitos found were individuals with immature oocysts on the stomach on 29th May and sporozoites occurred in the salivary glands in June. Further south in the Province mosquitos with mature oocysts were taken at the end of May. It appears therefore that the mosquitos responsible for the first fresh cases of malaria may belong to the overwintered or first generation but the latter is the more important.

- ПОПОВ (V M) Sur la biologie de l'*Anopheles maculipennis messeae* hibernant dans les locaux habités [Biology of Hibernating *A. m. messeae*].—*Med Parasit & Parasitic Dis* Moscow 1940 Vol 9 No 5 pp 503-504 [In Russian] [Summary taken from *Rev Applied Entom* Ser B 1943 Feb Vol 31 Pt 2 pp 24-25]

Females of *Anopheles maculipennis* var *messeae* Flin have been observed in various parts of the Russian Union to emerge from hibernation in warm rooms and suck blood some time before they appear in the open. In investigations in western Siberia in 1939 large numbers of mosquitos were taken on 27th March in an inhabited house and in the basement of a hospital in a village north east of Tomsk and since this is the only variety of *A. maculipennis* M of var *typicus* it is assumed that they belonged to var *messeae*. The patients stated that the mosquito frequently attacked them and a few very active ones were present in the wards. Of the 76 individuals taken in the living room and kitchen of the house 17 (22.4 per cent) contained blood and most of these had evidently fed on the day of capture or on the preceding day. A calf was kept in the kitchen and precipitin tests with blood from eight of the mosquitos showed that five had fed on cattle and one on man. The results for the other two were negative. In all 28 mosquitos were dissected mature eggs occurred in two of them but were abnormal in one of these. Of the 15 individuals that had not yet taken blood only two contained any considerable amount of fat and the others had evidently terminated hibernation. Of the seven females taken in the hospital five contained mature eggs. Mosquitos were not observed in day time shelters in Tomsk until 25th April. It is concluded therefore that mosquitos in inhabited buildings began to suck blood some 10 months before they left them though the females with mature eggs were found as early as 27th March.

- КРАТОВА (V I) Sur le remplissement du jabot chez les *Anopheles maculipennis messeae* gorges de sang. [Distension of the Crop of Engorged *A. m. messeae*].—*Med Parasit & Parasitic Dis* Moscow 1940 Vol 9 No 5 pp 505-507 With 1 fig & 1 graph [In Russian] [Summary taken from *Rev Appl Entom* Ser B 1943 Feb Vol 31 Pt 2 p 25]

Females of *Anopheles maculipennis* var *messeae* Flin taken in the Province of Kuzbyshev during 1935-37 were frequently observed to have the crop distended with fluid so that it occupied part of the abdomen. Investigations were carried out on individuals taken in hibernation quarters in winter and in daytime shelters in summer. The former were allowed to feed in the laboratory and had access to water. Various degrees of crop distension were observed in these after feeding and in the summer mosquitos and the author describes and figures 11 stages in which the portion of the abdomen filled by the crop ranged from one half of a segment to three complete segments. The percentage showing crop distension increased from May to September in the summer mosquitos with a light decrease in July and findings were confirmed by observations in hibernating individuals. These findings were confirmed by observations in Kazan in the summer of 1938.

- BLAKHOV (A A) & KUPITZOVA (A D) Le transport des moustiques malingènes par les navires [Transport of Malaria Vectors in Boats]—*Med Parasit & Parasitic Dis* Moscow 1940 Vol 9 No 5 pp 508-510 With 1 graph [In Russian] [Summary taken from *Rev Applied Entom* Ser B 1943 Feb Vol 31 Pt 2 p 25]

Periodical inspection between May and September 1938 of river steamboats arriving at Astrakhan showed that malaria mosquitos [*Anopheles maculipennis* Mg] occurred on a high proportion of them. The most infested were local boats that plied in the delta of the Volga. The mosquitos were most abundant in June and July, and occurred chiefly in quarters in which the passengers were most crowded. No considerable numbers of mosquitos were found in buildings close to the landing places in the villages and towns at which the boats called. Of 875 mosquitos taken on these boats between 14th July and 25th September during which period the incidence of malaria in the region usually increases none was found infected with malaria parasites.

- RUSSELL (Paul F) & RAO (T Ramachandra) On Relation of Mechanical Obstruction and Shade to Ovipositing of *Anopheles culicifacies*—Reprinted from *Jl Experim Zool* 1942 Nov 5 Vol 91 No 2 pp 303-329 With 6 figs [10 refs]

The authors working in a rice growing area in the Madras Presidency observed that *Anopheles culicifacies* breeds in numbers in the paddy field till the plants reach a height of about 12 in. After that the larvae of this species cease to be found. In the present paper they describe experiments in which they attempt to analyse their field observations by introducing artificial mechanical obstructions and shade.

They base their conclusions on collecting eggs and identifying the species from them. It has been shown that when the rice plant reaches a height of a foot or more not only the larvae but also the eggs of *A. culicifacies* are absent but if eggs are introduced from elsewhere they hatch and the larvae feed successfully. It follows that the absence of early stages from this particular habitat is not due to such a factor as predators but to the water ceasing to be attractive to the female mosquito.

The authors then dug small pits in which they planted numerous glass rods vertically. These rods were about as close as growing rice and offered a mechanical obstruction without shading the water or altering its chemical composition. It was found that the glass rods greatly reduced the number of visits paid by this species of mosquito for the purpose of laying eggs. Numerous eggs were laid in the control pit and also in the experimental pits when the rods were removed. Similar experiments were performed using rice plants growing in test tubes greatly reduced the number of eggs of *culicifacies* which are deposited but that shade by itself has not this effect. Certain other species of *Anopheles* are much less reduced by the obstructions. The same principle is shown to hold good with shallow open wells access to which was partly obstructed by matting. The authors of this very interesting paper point out that when the female *A. culicifacies* is laying her eggs she hovers a few inches above the water without touching the surface. It seems possible that the

growing rice or the artificial obstructions interfere with this activity and in that way reduce the deposition of the eggs *P A Buxton*

THOMSON (R C Muirhead) *The Control of Anopheles minimus by Shade and Related Methods—Indian Med Ga* 1942 Nov Vol 77 No 11 pp 675-676

The author gives a brief summary of certain parts of his work on the biology of *Anopheles minimus* in Assam. The paper will serve to introduce this important subject to a wider series of readers. Among other points he shows that whether *A. minimus* is controlled by shade or by clean weeding (and both methods have been used in practice) essentially the same thing is happening for shade does not in itself repel the female mosquito when she is looking for a place to lay eggs but it does kill the grass and so destroy the little sheltered niches in which she would have laid them. In fact both shading and removal of weeds operate by increasing the rapidity of the flow of the water

P A Burton

RIGDON (R H) *A Consideration of the Mechanism of Death in Acute Plasmodium falciparum Infection. Report of a Case—Am r Jl Hy* 1942 Nov Vol 36 No 3 pp 269-275 [18 refs]

The author starts his paper with a discussion of the pathological lesions observed by himself and other authors in monkeys dying with *P. knowlesi* infection. He suggests that tissue anoxaemia is responsible for such lesions. The anoxaemia results from a rapid destruction of red cells and a high degree of parasitization of the remaining red cells. A temporary lack of oxygen causes increased capillary permeability. Resulting haemoconcentration may be such that the capillaries are tightly filled with cylinders of packed red cells. The clinical and pathological manifestation of anoxaemia are similar to those of shock syndromes of adrenal insufficiency and toxæmia that have been described in malaria may have been manifestations of shock.

The author describes a case of a fatal uncomplicated *P. falciparum* infection in a child seven years of age of whose body a complete post mortem examination was made three hours after death. The pathological lesions found in this child are very completely described. They lend support to the above considerations. The lesions were in fact similar to those observed in cases of shock. It is noteworthy that the blood in the circulatory system was not coagulated three hours after death. It has been said that incoagulability of the blood is characteristic of shock.

Norman White

CONTAEVA (A A) *The Treatment and Prevention of Hypertoxic Tertian Malaria in Children—Med Parasit & Parasitic Dis* Moscow 1942 Vol 11 No 3 pp 126-129 [In Russian]

Attention is drawn to the occurrence in various parts of central Russia of severe forms of benign tertian malaria among children between the ages of four and eighteen. The clinical picture of such cases is characterized by the sudden appearance of cerebral symptoms

accompanying the paroxysm of fever. The clinical manifestations progress rapidly and the disease terminates suddenly in death usually before treatment can be started. As a rule the histories of such patients point to B T malaria during the previous autumn and to relapse attacks in the current year.

The only method of dealing with such cases is immediate injection of acriqueine [atebrin] or quinine ready made solutions of which must be available in localities where fulminating juvenile malaria is commonly observed. The dosage according to age is given in a table. For purposes of prevention it is urged that malarial patients should undergo a full course of therapeutic and prophylactic treatment to minimize the risk of relapses.

C A Hoare

SHAPKIN (L. A.) *Gambusia affinis* et *Leucaspis delineatus* dans la lutte contre les larves de l'*Anopheles* [*G. affinis* and *L. delineatus* in Larval Control]—*Med Parasit & Parasitic Dis* Moscow 1940 Vol 9 No 5 pp 511-514 With 1 fig [In Russian] [Summary taken from *Rev Applied Entom* Ser B 1943 Feb Vol 31 Pt 2 pp 25-26]

Gambusia affinis holbrooki which destroys Anopheline larvae was introduced into the Province of Dnepropetrovsk (central Ukraine) from Abkhazia in 1934. It multiplied in the summer and survived the winter but died out in most of the waters in spring and a study was therefore made of the types of water in which it would thrive. The steppe rivers appeared to provide the most suitable conditions since they are shallow and have a slow current sloping banks a muddy bed and abundant aquatic vegetation. Artificial reservoirs should be at least 40 ins deep and protected from wind and should have sloping banks submerged aquatic plants a rich zooplankton and a muddy bottom free from hydrogen sulphide. The presence of springs is desirable. Analysis of the stomach contents of these fish showed that they prefer animal to vegetable food but are able to survive on protozoa and algae for an indefinite period. They were destroyed by pike and perch but not by carp. Other natural enemies in the Province include the predacious bug *Nelotecta glauca* L. which is present in numbers wherever *Gambusia* is abundant and ducks. Since gravid females were common at water temperatures of 11-12 C [51.8-53.6 F] it is suggested that waters infested with Anopheline larvae should be stocked with *Gambusia* in April so that the first brood would be produced in May. Superfluous aquatic vegetation along the banks should be removed as it affords shelter to the mosquito larvae. As a result of breeding *Gambusia* under suitable conditions it was available in large numbers in 1938 and over 600 acres of waters were stocked with it.

Leucaspis delineatus is the most effective of the local fish that feed on Anopheline larvae. Owing to the position of its mouth it feeds on objects occurring at or near the surface of the water. It remains near the banks where mosquito larvae occur and is very active and voracious. It spawns from April to the end of June and unlike *Gambusia* overwinters in any fresh water that does not freeze to the bottom. Some 25 acres of water were stocked with this fish in 1938. It was found that the most effective rates of release were 5 per 10 sq ft for *Gambusia* and 7-8 for *Leucaspis*.

RODHAIN (J) Les plasmodiums des anthropoïdes de l'Afrique centrale et leurs relations avec les plasmodiums humains [Plasmodia of Central African Apes and their Relationship to Human Plasmodia]—*Ann Soc Belge de Med Trop* 1940 Dec 31 Vol. 20 No 4 pp 489-505 With 1 chart & 6 figs on 1 plate

In an earlier communication [this Bulletin 1940 Vol 37 p 669] the author described experiments designed to throw light on the relationship of the three common human malarial parasites to the three similar if not identical organisms which occur in the blood of wild chimpanzees in West Africa. It was then concluded that *Plasmodium reichenowi* was distinct from *P. falciparum* which it closely resembled. It was not inoculable to human beings and in culture revealed certain morphological peculiarities. Moreover *P. falciparum* itself could not infect chimpanzees. *P. schuetti* was not virulent for human beings and was probably distinct from *P. vivax* which it resembled and which could survive for three or four weeks in the chimpanzee as an inapparent infection. Such survival was demonstrable not by the discovery of parasites in the blood but by inoculation of blood to susceptible paralytics. It was pointed out that the appearance of *P. vivax* like parasites in the blood of a chimpanzee inoculated by MESNIL and ROUBAUD some years ago may have been due to stimulation of an unsuspected and latent *P. schuetti* infection and not to the *P. vivax* which had been inoculated. As regards *P. adleri* the quartan like parasite of the chimpanzee want of material prevented any attempt to inoculate this parasite to human beings. On the other hand two attempts to infect chimpanzees with *P. malariae* failed but as the blood inoculated was not perfectly fresh it was impossible to draw any definite conclusion from this test.

The receipt in Belgium in 1939 of a new chimpanzee from the Belgian Congo afforded an opportunity of studying the question of *P. rodhaini* for the ape supposed to have a mixed infection of *P. reichenowi* and *P. schuetti* proved to have a triple infection of both these parasites and *P. rodhaini*. The last named parasite was successfully inoculated to other chimpanzees and its cycle of development shown to occupy 2 hours. Morphologically it seemed indistinguishable from *P. malariae*. Though the inoculated chimpanzees were already chronically infected with *P. reichenowi* and *P. schuetti* they revealed no cross immunity to the new parasite. In another series of experiments *P. rodhaini* was inoculated from the chimpanzees to four general paralytics all of whom developed infections indistinguishable from infections due to *P. malariae*. The strain established in human beings was successfully passed to other human beings. It is concluded from these experiments that the quartan like parasite of the chimpanzee is identical with *P. malariae* and that the name *P. rodhaini* becomes a synonym of *P. malariae*. The experiment of inoculating *P. malariae* to chimpanzees needs to be repeated under more favourable circumstances—possibly in West Africa. During the inoculations of the blood to human beings in two cases the blood was taken from an ape which harboured *P. schuetti* as well as the quartan like parasite. With the appearance of *P. malariae* in the blood of the inoculated individuals there appeared also a parasite which morphologically resembled *P. vivax* and *P. schuetti*. As noted above all previous attempts to inoculate *P. schuetti* to human beings had failed to produce any infection. The case was

complicated by the fact that this chimpanzee had been inoculated over two years before with *P. inax* from man which had survived for some weeks as demonstrated by inoculation of blood to other human beings. During the following two years it had not been possible to demonstrate any longer survival of *P. inax*. It would seem probable therefore that the *P. inax* like parasite was actually *P. schweii*; and that unless one is prepared to admit that *P. inax* can survive in the chimpanzee as an unapparent infection for over two years certain strains of *P. schweii* may give rise to transient infection in man.

C M Wenyon

GINGRICH (Wendell D) & FILLMORE (Rollin S) The Antimalarial Effect of Acranil In Birds—*Amer J Hyg* 1942 Nov Vol 36 No 3 pp 276-282 With 2 figs [28 refs]

The authors have tested the action of acranil (3-chloro-7 methoxy 9 diethylamine β hydroxy propylamino acridine dihydrochloride) on *Plasmodium cathemerium* infection in canaries and on *Haemoproteus columbae* infection in pigeons. The drug a yellow dye which has been used successfully for the treatment of lamblasis in man proved to be as effective as atebirin for the parasite in the canary. It was without effect on the gametocytes of *P. columbae* in the pigeon. Its action on the malarial parasite like that of atebirin quinine and other anti-malarials is due to its power of reducing the number of mature schizonts or segmenters and the number of merozoites of those schizonts which reach maturity. Acranil is excreted or destroyed more rapidly than atebirin hence the single dose is active in the body for a shorter time than the single dose of atebirin. The effective dose of acranil was toxic to canaries but this toxicity was largely overcome by administering it in a 5 per cent solution of gelatin.

C M Wenyon

HEWITT (R I) RICHARDSON (A P) & SEAGER (L D) Observations on Untreated Infections with *Plasmodium lophurae* in Twelve Hundred Young White Pekin Ducks—*Amer J Hyg* 1942 Nov Vol 36 No 3 pp 362-373 With 5 figs [10 refs]

In a previous paper [this *Bulletin* 1943 Vol 40 p 222] the first author described the course of *Plasmodium lophurae* infection in 300 adult ducks of different breeds. In the present paper an account is given of the infection in 1 200 young ducks 1 to 12 weeks old and all belonging to a particular strain of the giant white Peking duck. The infections were produced by intravenous inoculation of blood drawn from the heart of an infected duck into an equal volume of citrated saline. The course of the infection was followed from day to day and the amount of blood haemoglobin determined. The influence of the age of the ducks and the dose of parasites on the character of the infection was noted with a view to the determination of the optimum conditions for testing chemotherapeutic agents. It was decided that for qualitative tests the best results were given by using ducks two weeks old inoculated with two billion parasites per kilogram of body weight the parasites having been taken from a duck on the fourth or fifth day after inoculation. With this dosage of parasites the peak of the infection is reached on the 4th to the 7th day after inoculation. If parasite counts are made on these four days the peak of the infection will be included in nearly 100 per cent of the birds. For quantitative

tests ducks six weeks old were used as these produce the most uniform infections. Furthermore the older ducks show a higher mortality rate than the younger ones. By adhering to this standardized routine it has been possible to measure comparatively the action of known plasmodicidal drugs as well as that of several new compounds. [See also paper by MARSHALL this Bulletin 1943 Vol 40 p 223]

C M Heyon

DEVINE (J) & FULTON (J D) The Pigment formed by *Plasmodium gallinaceum* Brumpt 1935 in the Domestic Fowl—*Ann Trop Med & Parasit* 1942, Dec. 31 Vol 36 No 4 pp 167-170

By methods similar to those by which the authors investigated the nature of the pigment produced by *Plasmodium knowlesi* in the blood of the monkey [this Bulletin 1942 Vol 39 p 438] they have studied the pigment of *P. gallinaceum* in the blood of the fowl. The infected cells were lysed by distilled water instead of by saponin used in the previous work as this proved unsatisfactory for the bird parasite. Attempts were made to free the pigment from protein by peptic digestion but though some was removed much remained undigested. The spectroscopic and chemical investigations showed that the pigment as in other cases is haematin. This is the first time that the exact nature of the pigment produced by a malarial parasite of birds has been determined.

C M Heyon

BLACKWATER FEVER

MAEGRAITH (Brian) FINDLAY (G M) & MARTIN (N H) Mechanism of Lysis of Red Blood Cells [Correspondence]—*Nature* 1943 Feb 27 Vol 151 No 3826 pp 25-253

From a study of the aetiology of blackwater fever the authors have gone on to examine the wider problem of red cell destruction in the body. They have observed that slices of certain tissues will lyse saline suspensions of washed red cells but only if those tissues have first been thoroughly washed in saline; they do not lyse unwashed red cells. Lysis can be prevented by addition of animal serum to the mixture (even heterologous serum within a definite range of dilution) by the addition of sodium cyanide (to 1 in 20 000 000) or mercuric chloride (to 1 in 32 000) or by heating the tissue slices to 80 C. The lytic agent appears to be species specific but the serum inhibitor is not.

The lytic agent would seem to be an enzyme though this has not been proved; this apparently exists in the animal body but is held in check by an inhibiting substance present in tissues and serum. Abnormal lysis as in blackwater fever may therefore be due to interference with the activity of the inhibitor.

C H

LEISHMANIASIS

BOBROV (M V) On the Treatment of Cutaneous Leishmaniasis with Blood Dressings—*Med Parasit & Parasitic Dis* Moscow 1942 Vol 11 No 3 pp 90-92 [In Russian]

The author describes the application of blood dressings in the treatment of cutaneous leishmaniasis (Pendeñ Sore) as used by him in Central Asia

On admission the patients usually had ulcers covered with various ointments or antiseptics. These were carefully removed from the lesion leaving a clean surface. From 5 to 10 cc of blood were then taken from the patient with a syringe a cloth was copiously soaked in the blood and applied to the sore. The dressing was usually changed next day and subsequently every fourth or fifth day. As a rule ulcers which are at first covered with flabby anaemic granulation tissue and have a purulent discharge or a crust become unrecognizable after two blood dressings the granulation crust is readily detachable there appear fresh proliferating granulation elements which fill the entire cavity of the ulcer and are sometimes accompanied by formation of epithelium.

If the healing had been progressing satisfactorily in later dressings blood was substituted by cod liver oil.

On the average the ulcers healed after 5-6 blood dressings the duration of the treatment being from 2 to 3 weeks. The total amount of blood required varied from 50 to 100 cc the loss of which had no harmful effect upon the condition of the patients. Sores complicated by thrombophlebitis and lymphangitis were not amenable to treatment with blood dressings.

This method of treatment of cutaneous leishmaniasis is recommended not only on account of its effectiveness but also because in view of its simplicity it can be employed under various conditions by inexperienced medical personnel.

[It will be remembered that Pendeñ sore is the moist type of comparatively short duration which LATYCHEV and KRIVKOVA (thus *Bulletin* 1943 Vol 40 p 296) differentiate from the more chronic Ashkhabad sore.]

C A Hoare

BELTRAN (Enrique) & BUSTAMANTE (Miguel E) Datos epidemiológicos acerca de la úlcera de los chichleros (leishmaniasis americana) en México [Epidemiological Notes on Gum Collectors Ulcer (American Leishmaniasis) in Mexico]—*Rev Inst Salubridad y Enfermedades Trop* México 1942 Mar Vol 3 No 1 pp 1-28 With 4 maps (1 folding) & 6 figs [18 refs] English summary

Cutaneous leishmaniasis was first recorded from the Yucatan peninsula by SEIDELIN in 1912. Since that time a number of investigators have described the disease and the circumstances of its occurrence in this part of México. In the present paper an account is given of a more extended study of the condition. The disease occurs in the forests which cover roughly three quarters of the peninsula leaving the north western quarter as cleared agricultural land in which apparently leishmaniasis is not present. The persons afflicted are the *chichleros* or gum collectors consisting of groups of men women and children who live in the forests for varying periods—but most usually during the autumn. The enquiry carried out by inspection and

questionnaires showed that among 1 506 individuals 169 suffered from the disease. Some of these were old cases for of the total 71 cases only had occurred during the year of enquiry. The lesions are found most commonly on the ears or arms and usually only a single one is present. In the 1 506 persons examined 17 per cent of the men 2 per cent of the women and 0.7 per cent of the children were affected. The disease commences most commonly during the six months August to January. There is no available information as to the method of infection.

C M Wenyon

NEHAUL (B B G) Dermal Leishmaniasis—*Caribbean Med J* 1942 Vol 4 No 3 pp 101-103 With 1 plate

The case described is that of a male aboriginal Indian 54 years of age of Demerara British Guiana who was suffering from lumps and ulcers on the right arm. The lumps or nodules were in the subcutaneous tissue. The skin over many of these was easily movable but in others it was adherent and had become smooth and shiny. Elsewhere the skin had broken down and granulomatous ulcers had formed. The spleen was slightly enlarged as also were axillary and inguinal lymphatic glands. In serum expressed from the nodules or ulcers leishmania were discovered. Treatment by intravenous injections of 2 per cent solution of tartar emetic in doses of 2.5 cc twice a week for eight weeks was followed by some improvement the nodules becoming smaller and the ulcers beginning to heal.

C M Wenyon

REY (Florentino) Aislamiento de tres cepas de leishmania [Isolation of Three Strains of Leishmania]—*Rev. Facultad de Med. Bogotá* 1942 Aug Vol 11 No 2 pp 103-106 With 4 figs on 3 plate

The paper records the isolation in culture of three strains of *Leishmania brasiliensis* from three cases of cutaneous leishmaniasis in Colombia.

C M Wenyon

FEVERS OF THE TYPHUS GROUP

FRÓES (João A G) Febres do grupo tifo exantemático [Fevers of the Typhus Exanthematicus Group]—*Brasil Medico* 1942 Nov 7 & 14 Vol 56 Nos 45 & 46 pp 503-508 With 1 chart

This racy lecture shows how the subject can be simplified and clarified by regarding the typhus like fevers as being essentially similar from the clinical point of view and as comprising distinct epidemiological types according to the vectors concerned in transmission.

The classification adopted by the author is (1) European or louse typhus (2) flea and louse or Mexican typhus (3) tick or Indo-American typhus (4) mite or Japanese typhus and (5) typhus of uncertain vector.

John W D Megaw

PLOTZ (Harry) Complement Fixation in Rickettsial Diseases —
Science 1943 Jan 1 Vol 97 No 2305 pp 20-21

By the use of a new technique the complement fixation test has been successfully used to differentiate epidemic typhus from the endemic type of the disease. Details of the method of preparing the new antigen are promised. The material used is obtained from the yolk sacs of infected chick embryos and the antigens are standardized against convalescent sera of known titre from human beings and guinea-pigs recovered from epidemic and endemic typhus. The tests were made on convalescents from epidemic and endemic typhus and Brill's disease. The results are summarized as follows —

Disease	Epidemic Rickettsial antigen	Dilution	Endemic Rickettsial antigen	Dilution
Endemic typhus (43)	34 negative 9 positive	1-6 to 1-24	All positive	1-12 to 1-384
Epidemic typhus (29)	All positive	1-12 to 1-768	26 negative 3 positive	1-24 to 1-96
Brill's disease (23)	All positive	1-12 to 1-1436	10 negative 13 positive	1-6 to 1-384

In every case in which cross fixation occurred the specific antigen reacted with the homologous serum in a higher titre than with the heterologous serum. The difference in titre was usually great.

Absorption tests were made on sera from cases of Brill's disease in which cross fixation occurred. Endemic antigen removed all the endemic antibody but little of the epidemic antibody. Epidemic antigen removed both the epidemic and endemic antibody.

These serological findings support ZINSSER's view that Brill's disease is of the epidemic type and that it is not transmitted from man to man simply because lice are not present [this *Bulletin* 1935 Vol 32 pp 154-563]. It will be remembered that Zinsser regarded Brill's disease as a recrudescence or relapse of true typhus originally contracted in Europe. Many of the people mostly Polish Jews who have developed Brill's disease have been in New York 10-30 years. The observations strongly suggest that man serves as the reservoir for epidemic typhus between outbreaks just as the rat does in endemic typhus. By applying the new test endemic typhus has already been discovered in Jamaica and epidemic typhus in a South American country. Other surveys are being made.

In the text the results in the 43 cases of endemic typhus are stated as 36 negative to the epidemic antigen and 6 positive.

REMOND (Martial) L'alimentation des indigènes et le typhus érythémateux [The Diets of Indigenous Populations and Typhus Fever]—*Arch Inst Pasteur d'Algérie* 1941 Sept Vol 19 No 3 pp 336-338

The author who is an experienced administrator was asked by Ed SERGENT and PARROT whether he could suggest any reason for the

peculiar distribution of typhus in Algeria. His reply is contained in this note. In the Labyha region where the disease occurs only in occasional outbreaks due to imported infection the people are well nourished their diet is well supplied with proteins carbohydrates fats and vitamins. On the other hand in the high plateau of Constantine where the disease is endemic and often widespread the people depend chiefly on their crops of barley and these are liable to fail in season of drought such as that of 1940. Their diet is on the whole inadequate and deficient in animal proteins fats and vitamins.

These general observations support the view of Sergeant and Parrot that the problem of louse-borne typhus is not simply one of lice but of lice associated with inadequate and deficient diet.

Two other possible factors are mentioned by the author—the heavily infected area is at an altitude of 800 to 1 000 metres and many of the inhabitants are semi nomadic.

John B. D. Macfarlane

CHIARI (Hermann) Zur pathologischen Anatomie des Fleckfiebers. [The Pathological Anatomy of Typhus Fever]—*Wien Klin. Woch.* 1942 Nov 27 Vol 55 No 48 pp 946-948

The paper deals only with acute cases in which death occurred between the 8th and 10th days but a large number of these were available. Naked eye examination revealed changes which appear non specific though it corrected such clinical diagnoses as acute abdomen gastro-enteritis and infective angina. The rash was still evident in many cases and was often observed on the palms but not on the soles. Congestion of the brain cortex and meninges was a prominent feature. The lungs were dark red and congested sometimes there were ecchymoses in the pleurae. The heart was flabby and greatly distended with dark red blood the myocardium was friable. The spleen was always enlarged often weighing 500 grammes it was soft and therefore not easily palpable during life. The spleen pulp was dark red greatly congested and haemorrhagic. Catarrhal colitis especially of the caecum was common. The testicles were often swollen and oedematous. The muscles had a dried up appearance. The Weil-Felix reaction was often strongly positive even after death.

The histological changes were specially associated with the smaller arteries but were not strictly of the periarteritis nodosa type that is usually described. The condition was one of band like infiltration surrounding the vessel like a sheath the extreme necrotic changes so often mentioned were not seen though swelling of the intima and thrombus formation were frequent. The perivascular infiltrates consisted chiefly of lymphocytes with a few polymorphonuclear cells. Proliferation of the adventitial and endothelial cells occurred and there was sometimes also a certain amount of necrosis of the intima. Escape of blood from the dilated vessels is the basis of the petechiae. The vascular lesions were prominent in the brain heart testicles stomach and intestines. In the heart they caused focal patches of interstitial myocarditis the cell infiltrations consisting of macrophage cells lymphocytes and a few polymorphonuclears. In the brain the most pronounced lesions were in the medulla and pons in addition to the changes seen in the small vessels there were nodular patches of proliferation of the glia cells.

John B. D. Macfarlane

LAURENTIUS (Paul) *Über Kreislaufbefunde bei Fleckfieber* [Cardiovascular Findings in Typhus Fever]—*Deut Med Woch* 1942 Dec 4 Vol 68 No 49 pp 1187-1189 With 4 figs [14 refs]

Disturbances of the peripheral circulation occur early in typhus fever in severe cases pallor of the skin coldness of the extremities slight cyanosis and low blood pressure may be observed as early as the third day and may justify an early diagnosis before the appearance of the rash. They are explained by damage to the vasomotor centres caused by the formation of nodules in the small blood vessels. Myocardial lesions play an important part later on but do not account for the early manifestations.

In severe cases the electrocardiograph may give indications of myocardial damage from the third or fourth day onwards. The findings are of the same type as those seen in diphtheria. A flattening of the T wave on leads I and II gives the earliest indication of a pathological change. Later the wave becomes diphasic or inverted in some cases. Other changes in the electrocardiograms are described and illustrated. The return of the curve to normal usually takes two or three months and until it is fully established exertion must be strictly forbidden. The special value of the electrocardiograph is that it often shows indications of abnormality during and after the illness when there is no other evidence of cardiac insufficiency. It is the best guide to treatment and also to the fitness of the patient for further active service.

LAMPERT's recommendation of hot baths in treatment is criticized. It is based on the assumption that death is caused by collapse of the peripheral circulation rather than by damage to the heart muscle. The author stresses the importance of the latter factor and holds that hot baths should not be given in cases of failing circulation though they are useful after the successful use of a course of drugs like sympatol, cardiazol and camphor. Caffeme is useful. Saline infusions are of value especially in cases of tissue dehydration and falling blood pressure. Strophanthin in moderate doses cannot be dispensed with until a truly specific treatment by chemotherapy or immune serum is available.

John H. D. McGaw

SILLA (Adolf) *Ursachen Verhütung und Behandlung der Gliedmassengangrän beim Fleckfieber* [The Causation Prevention and Treatment of Gangrene of the Limbs in Typhus Fever]—*Deut Med Woch* 1942 Dec 4 Vol 68 No 49 pp 1185-1186

Gangrene in typhus is usually restricted to small areas but occasionally is extensive and may necessitate amputation of one or both legs. Coldness and blueness of the feet and unexplained sudden attacks of pain in the legs are warning signals. Usually there is a further rise in the temperature. The onset is commonly about the 11th to the 13th day. The pulse in the dorsalis pedis artery is feeble or absent. Thrombosis is restricted to the small vessels though in rare cases the large arteries may be involved. The large veins are never thrombosed. In 10 per cent of the cases there is actual stenosis of the arteries. Spasm of the vessels is believed to play the chief part by some this is regarded as being due to the formation of nodules in the vessels of the vasomotor centres of the brain but this cannot be a complete explanation because the condition so often follows exposure of the limb to cold and is rarely seen in warm weather. Prevention

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consists chiefly in keeping the ward warm and in seeing that the patient's limbs are kept covered by the blankets. When the feet are cold and the dorsalis pedis pulse is feeble dry heat should be applied and the limbs should be wrapped in cotton wool. Pain caused by spasm of the arteries is relieved by padutin. When thrombosis has occurred large doses of this drug are essential. 1 to or three ampoules are given four times daily and the dose may have to be doubled if prompt relief does not follow. Doses of 25 milligrammes of testosterone or 50 000 units of progynon are useful if given early. When gauze has set in the sympathetic block is carried out with 1 per cent novocaine (without adrenalin) of which 75 cc are given by paravertebral injection and 200 cc proximal to the affected part. If the circulation is restored these injections are repeated on the two following days. When gauze is established the line of demarcation is awaited and amputation carried out.

John W. D. Macfarlane

MIHALJEVIĆ & RADIČEVIĆ. The Blood Picture in Typhus — Lijecnički listnik Zagreb 1942. July No 7

The following is a translation of a German abstract of the paper dealt with —

The blood picture is characteristic and important for prognosis. At the start the white corpuscle count is somewhat raised and tends to increase during the disease especially in severe cases [but] leucocytosis is often [followed by] a sudden drop of the leucocyte count [The abstract is over-compressed at this point]. There is usually neutrophilia with a shift to the left and a hypersegmentation with pathological nuclear forms [Note that if there is a shift to the left these will be of the so-called macropolyocyte type which may be found in up to 3 per cent in certain tropical diseases]. After a few days of lymphocytosis there will be an equally short period of lymphopenia but finally there is convalescent lymphocytosis. During the early lymphocytosis typical large lymphocytes are found [probably the pathological lymphocytes of Osgood]. The monocytes increase [relatively] with the leucocytosis and decrease during the leucopenia. Eosinophilia usually starts during convalescence. Cases with white counts above 20 000 have a bad prognosis as do those with a progressive increase in count. One must regard seriously those cases in which there is a marked qualitative change in the blood picture and any in which the peripheral blood contains definite plasmocytes numerous histiocytes and endothelial cells.

H. P. Kennedy

WINDORFER (A). Ueber besondere Verlaufsform des Wollhymen fieber bei der Truppe (Peculiar Types of Trench Fever in the Troops [German]). — Deut. Med. Woch. 1942. Nov. 20. Vol. 68. No. 47. pp. 1144-1146.

From the end of January a number of soldiers in a section of the middle part of the eastern front began to complain of rheumatic pains in the legs accompanied by low fever. Avitaminosis was first suspected but could be excluded. Then the trouble was thought to be either a complication of influenza or a specific infection. A clue to the diagnosis was found in a passage from the official Handbook for Military Doctors. This was borne out by pains in the legs are a cardinal symptom of trench fever.

About 50 cases were seen and all but one of these differed strikingly from the standard descriptions in which emphasis is laid on the occurrence of sharp febrile paroxysms at five-day intervals. In the exceptional case this feature was pronounced. The usual symptoms were severe pains in the shin bones bearable by day but becoming so severe at night that their comrades were kept awake by the groans of the victims. The pains were increased by warmth and when the patients were lying down the temperature was 37.2 C to 37.5 C in the morning and 37.6 to 37.9 in the evening. After a few days the pains often shifted to the knees and thighs or wandered from one site to another in the lower extremities they were sometimes referred to the joints sometimes to the muscles and often returned again to the shin bones. They persisted day after day without the periods of respite that are regarded as characteristic of the disease. The average duration was nine days the range being from one to two weeks. Eight of the patients had single recurrences lasting eight to fourteen days after periods of freedom of two or three weeks. There were also some abortive attacks lasting three or four days in which there was little or no fever and the patients remained on duty.

Objectively there was little or nothing to see except that the patients looked pale and depressed. A few had slight tenderness over the shin bones some had a tender point over the middle of the front edge of the tibia. Movement of the affected joints was not impaired. Aspirin and pyramidon often gave relief sometimes morphia was needed but even this occasionally failed. Only the worst cases were admitted to hospital most of the patients were given indoor duties which helped to distract their attention. Malingerers could usually be excluded by the slight rise in temperature and the special severity of the pains at night. The military importance of the disease consisted only in the temporary period of disablement.

John H. D. Megaw

JIMENEZ MARTÍNEZ (Pedro). Consideraciones epidemiológicas sobre el foco Santandereano de fiebre petequirul [An Epidemiological Study of a Focus of Petechial Fever (Tick borne) in Santander (Colombia)]—*Rev. Facul. de Med. Bogotá* 1942 Oct Vol 11 No 4 pp 183-194

The typhus fever of Colombia was long regarded as a variety of typhoid. In 1922 PATINO CAMARGO first described tifo negro en Bogotá. He isolated the virus by inoculating the blood of patients into guinea-pigs and transmitted the infection to guinea-pigs by the bites of lice which had been fed on patients. The virus caused no scrotal reaction and the mortality in experimental animals was low. In 1935 the same worker described a new kind of typhus the petechial fever of Tobia as a Rickettsial disease transmitted by *Amblyomma cyrenense* and other ticks. This disease was also observed in Bogotá, Narino and other places in Colombia. Late in 1941 and up to the middle of 1942 an identical fever was observed in three localities in Santander where the disease must have existed for many years without being identified. The disease occurred in sharply restricted foci consisting usually of one or two huts occupied by agricultural workers and swarming with blood-sucking arthropods of many kinds. The residents of the huts often died in rapid succession.

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after an illness of about eight days in which the clinical features were those of very severe tick borne typhus of the Rocky Mountain type. The first case investigated occurred in December. Blood from a patient in the acute period of his illness was inoculated intracerebrally into mice and intraperitoneally into guinea pigs. The mice showed no reaction and the guinea pigs responded in a very indefinite way and had no scrotal reaction. Further passages were made in guinea pigs and in these there was always a typical febrile and scrotal reaction. Rickettsiae were isolated and injected into two rhesus monkeys which developed fever after an incubation period of five days and died 24 hours later. Cross immunity tests showed that the Rickettsiae were immunologically identical with those of the petechial fever of Tobia and the Rocky Mountain spotted fever. The disease was experimentally transmitted from animal to animal by the bites of *A. cajennense*.

The origin of occurrence suggested domestic transmission by vectors which had inherited the infection or had acquired it from animal reservoirs (possibly small rodents).

In another case the blood of a patient caused typical febrile and scrotal reaction in guinea pigs directly inoculated.

In the whole Santander region there were 37 cases of which 30 were fatal between November 1941 and June 1942. Of the 37 cases there were in small family outbreaks in which two to five persons were attacked at the same but were attacked sometimes in rapid succession but some times at long intervals. In one hut four persons were attacked simultaneously 61 days after the death of the first patient. In another hut second and third cases occurred at intervals of 6 and 4 days respectively. Scenics were detected and there must have been many others in the department of Santander. The general conclusion was that the disease is transmitted to man by ticks that there is no tendency to generalized epidemics that the disease is essentially rural and that it is peculiarly frequent in the hot season.

John H. D. Vega

PARKER (R. R.) *Ornithodoros* Ticks as a Medium for the Transportation of Disease Agents—*Public Health Rep* 1940 Dec 23 Vol 57 No 50 pp 1963-1966

Two ticks, *Ornithodoros sierrae* and *O. parkeri* have already been shown to be capable of harbouring for long periods (716 to 1001 days) certain disease agents of which they are not known to be spontaneous hosts or transmitters.

In the present note examples are given of the successful transportation of two species of Rickettsiae and one virus by ticks of the genus *Ornithodoros*.

In September 1940 seven specimens of *O. sierrae* were fed in Colombia on guinea pigs infected with Tobia petechial fever (Colombian spotted fever) and were sent by air to the Rocky Mountain Laboratory in Montana. Six were alive on their arrival ten days after the infection. Rickettsiae were isolated from two of the ticks by intraperitoneal inoculation of suspensions into guinea pigs and both strains showed complete cross immunity with the virus of Rocky Mountain spotted fever. Two ticks examined in the same way on the thirteenth day after feeding were negative. The remaining two ticks were used for feeding experiments on guinea pigs but the results were negative though one of these ticks was shown to be still harbouring the virus 29 days after the normal infecting meal.

On April 3rd 1941 J H S GEAR despatched from Johannesburg S Africa ticks which had fed on a guineapig infected with tick bite fever they arrived in Montana on May 9th Five were nymph *O. turicata* which had been sent from Montana on October 17th 1940 all of these were negative five were *O. moubata* bred in S Africa of these one nymph and two adult males were negative but the Rickettsia was isolated from suspensions made from two adult females which had made their infecting meal about 36 days earlier The Rickettsia caused typical fever and scrotal reactions in two guineapigs and was found by cross immunity tests to be evidently closely related if not identical with the virus of boutonneuse fever None of the nymphs of *O. parkeri* sent from Montana to South Africa survived The virus of spring summer encephalitis was recovered from two adult specimens of *O. moubata* which had fed 40 days previously on infected mice in Moscow Specimens of larval *Ixodes persulcatus* the native transmitting agent were not infective to mice into which they were inoculated

VAN DEN ENDE (M) STUART HARRIS (C H) HARRIES (E H R) & STEIGMAN (A J) Laboratory Infection with Murine Typhus — *Lancet* 1943 Mar 13 pp 328-332 [13 refs]

The accidental infection of twelve persons with murine strains of typhus is described and discussed In one laboratory attacks occurred in five of seven workers engaged on experiments with murine virus in the course of which mice were inoculated intranasally Each of the seven workers had been inoculated recently with one course of three doses of the Castaneda type of rat lung vaccine made of killed murine Rickettsiae six had also two courses and one a single course of a Cox type of yolk sac vaccine made of killed epidemic typhus Rickettsiae Each of the six workers received 6.75 cc of vaccine In the other laboratory (military) five of seven workers engaged on similar kinds of experiments with murine virus were attacked another worker who was not engaged in the experiments but only visited the laboratory for half an hour daily was also attacked All had recently been vaccinated with a course of four injections of the Cox type of vaccine (3 cc altogether for each person) and each had a further recall dose of 1.0 cc with the exception of the worker who took no part in the experiments One other worker in this laboratory was attacked but in somewhat different circumstances he also had been vaccinated

The workers in the military laboratory had also been exposed to risk of infection by an epidemic strain of virus but in conditions which made it unlikely that they were infected with this strain and their attacks were similar to those of the workers in the other laboratory who had handled only the murine strain Precautions in both laboratories included the wearing of rubber gloves and gauze masks and keeping the mice in a glass box while the inoculations were being carried out The outbreaks in both laboratories began soon after the intranasal inoculations were started Experiments with *Chr. prodigiosum* showed that large numbers of the organisms were disseminated into the air while suspensions were being inoculated intranasally into mice and for at least 45 minutes afterwards In halation of droplets was therefore regarded as the chief method of infection though infected dust may have been responsible in one case

Seven of the patients were admitted to hospital the attacks were moderately severe in three and mild in four. The onset was definite but was often followed by a period of a few days in which the symptoms were indefinite. The fever was remittent or intermittent and usually lasted 10 to 14 days. An obvious rash was seen in only three cases it was macular never petechial and was restricted to the trunk except in one case in which there was a slight extension to the arm. The spleen was palpable in five but sometimes not till the end of the fever. One patient had distressing tachycardia during convalescence he was incapacitated for six months. Four of the five other patients had ambulant attacks there was slight fever in two headache lasting four to twelve days was the chief symptom.

The difficulty of early diagnosis of cases without rash is great even with complete laboratory investigation. Weil-Felix tests were not helpful during the first week as is shown by the following table —

Table 1. *Proteus OX 19 Agglutinations*

The signs — \pm — indicate the result of the test the figures give the dilutions used

Subj ct	Pre o s to nset	Days after n et of d sease											
		4	5	7	9	10	11	12	15	18	19	23	
A	+ 0		+ 20	+60				+640					
E	- 0	- 0		\pm 20		+40				+80			
F			+ 20					+160			+500		
B	- 20										+1		
M	-40		+ 0		+35				+40		-40		
S	-40			+ 40			+80		160		+160	+80	

In five cases unsuccessful attempts were made to recover Rickettsiae from the blood at an early stage by guinea-pig inoculation. Lice which were fed on a patient during the stage of the rash remained uninfected. These negative results may have been due to partial immunity resulting from vaccination but cases are on record in which the virus has been recovered from patients in similar conditions.

Leucocyte counts up to the eighth day showed a distinct tendency to neutropenia in all but one of seven patients and moderate or pronounced monocytic increase was usual. The relative monocyte count ranged from 8 to 21 per cent in ten counts made on or before the eighth day on seven patients though in one case it was only 5 per cent on the fourth day but 12 per cent on the eighth.

[These and the numerous other reported cases of laboratory infection prove that killed vaccines as now used do not confer complete immunity at the same time they suggest that a substantial degree of partial immunity may result and that any subsequent attacks of louse-borne typhus in recently vaccinated persons are not very likely to be infective to lice.]

John W. D. Megaw

YELLOW FEVER

Fox (John P) & CABRAL (Antonio S) The Duration of Immunity following Vaccination with the 17D Strain of Yellow Fever Virus — *Amer J Hyg* 1943 Jan Vol 37 No 1 pp 93-120 With 11 figs [32 refs]

After the field trials with 17D vaccine in 1937 showed this strain of yellow fever virus to be safe and efficient for large scale human immunization [see this *Bulletin* 1939 Vol 36 pp 648-649] the most important question remaining to be studied was the duration of the immunity produced by this vaccine. A considerable amount of experimental and field observation justifies the conception that in yellow fever the presence of virus neutralizing antibodies in the blood serum in quantities detectable by mouse protection tests is evidence of effective immunity. Up to the present the most extensive study of immunity following vaccination against yellow fever is that by SAWYER which deals with the old method of employing immune serum and neurotropic virus [see this *Bulletin* 1936 Vol 33 p 622]. He found that persons so vaccinated responded with a quick rise in serum antibody titres which reached their peak during the first six weeks and then gradually fell following a curve which had reached a nearly stable horizontal level four years after vaccination. This level however was found to be somewhat lower than that observed among persons whose immunity had resulted from attacks of naturally acquired yellow fever. The duration of immunity following infection with 17D virus has previously been studied on a small scale only. SMITH PENNA and PAOLIELLO [this *Bulletin* 1939 Vol 36 pp 648-649] showed that the peak level of serum antibodies is usually reached by the twenty eighth day. They further reported a definite drop in serum antibody level at the end of one year among a group of twenty two persons tested. The authors of this paper have set forth a considerable volume of data on the immunity status of groups of persons inoculated at varying intervals up to four years.

The persons included in the present study were selected on the following basis (a) a known or reasonably presumed non immune state prior to vaccination (b) vaccination with 17D virus (c) the subsequent development of at least some degree of immunity as determined by the examination of a serum sample collected soon after vaccination (d) the availability of some portion of the first post vaccination serum sample for re examination and (e) the establishing of satisfactory identification at the time of re bleeding. Altogether studies on 926 persons are reported.

The standard intraperitoneal test in mice as reported by SAWYER and LLOYD [this *Bulletin* 1932 Vol 29 pp 198-199] was used in the first examination of most of the sera. Routinely six mice of 35-49 days of age are inoculated with each serum tested. The result is expressed as the ratio of the number of mice alive on the tenth day to the number of mice which were alive on the fourth day after inoculation. Conventionally ratios of 0/6 1/6 or 2/6 have been considered as negative of 3/6 or 4/6 as inconclusive and of 5/6 and 6/6 as positive. It has been found that with post vaccination results at least this interpretation is much too rigorous. Even in instances in which the ratio is 0/6 but the deaths of the mice are delayed re examination in a more sensitive test often reveals clearly demonstrable neutralizing capacity while with results of 1/6 and 2/6 this is the general rule.

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For the careful re-examination of the entire group of sera therefore a protection test recently devised by WHITMAN was used (manuscript in press). Whitman showed that mice up to 21 days of age are much more susceptible to intraperitoneal doses of neurotropic yellow fever virus than are older mice. For this test mice between 17 and 21 days of age are used. Only a small quantity of serum is necessary and the sensitivity of the test can be adjusted by using mice of different ages (the younger ones being more susceptible) by varying the concentration of the test virus or by altering the proportion of serum to virus suspension in the inoculum. It was found that the sensitivity of this young mouse test could be made to approximate that of the standard test of Sawyer and Lloyd if 19-day-old mice were given an intraperitoneal inoculum of 0.06 ml. per mouse composed of 0.04 ml. of the serum being tested and 0.02 ml. of a 20 per cent suspension of infected mouse brain.

Since many of the sera to be tested had been stored for long periods in ampoules an experiment was carried out to determine the possible importance of antibody deterioration. During the nine-month period over which this experiment was conducted no significant differences could be detected between the antibody titres of three test sera kept in sealed ampoules and samples of the same sera preserved in desiccated form.

Since the persons included in the study were inoculated with four different sub-strains of 17D virus they were divided into groups on the basis of the sub-strain received. Three of the sub-strains are designated as low α_e they had been passed in tissue culture between 220 and 230 times. The fourth sub-strain of virus had been passed in tissue culture for a considerably longer period. Vaccines prepared from it came from material of the 315th to 380th subcultures. These sub-strain groups were then re-divided on the basis of the approximate post vaccination interval at which later serum specimens were collected. The results obtained in the mouse tests on the sera showed certain differences in the duration of immunity produced in several of the vaccination groups. With respect to the virus sub strains the data are most significantly different for the high sub-culture groups. SOPER, SMITH and PENNA (Third Internat Congr for Microbiol. 1939 Report of Proc pp 351-353) have previously reported that this sub strain had lost some of its antigenicity and produced poor immunity results in the field. It is assumed that the more rapid loss of antibodies in individuals vaccinated with this sub-strain is to be correlated with its inferior antigenic character.

The evidence available indicated that the differences found among the low sub strain groups were due not to previously unrecognized differences in the antigenicity of the 17D sub strains concerned but to the different age compositions of the vaccination groups. The detailed analysis of the results by a revealed a well marked correlation between age and immune levels measured one month after vaccination and at later intervals particularly so. It is being found in sera from persons of less than ten years of age at the time of vaccination that both the immediate immune response and the subsequent duration of immunity in persons vaccinated against yellow fever.

The authors conclude that it would appear that vaccination of adult populations with a virus of established antigenicity results in a persistence of an immune state which is clearly satisfactory from the

group standpoint for at least four years and probably for much longer in children after vaccination the level of protective antibody does not rise so high as in adults and tends to fall more rapidly. Sera which showed no protective action in the routine mouse tests were re-examined by a more sensitive technique. By this means detectable antibodies were revealed in 61.8 per cent of the 139 sera re-examined. While even more sensitive tests might reveal the presence of antibodies in some of the remaining sera these observations suggest that serologically demonstrable immunity against yellow fever induced by living 17D virus may completely disappear in at least some cases.

Hugh H Smith

BUSTAMANTE (Miguel E) KUMM (Henry William) & HERRERA (Julio Roberto) Ausencia de fiebre amarilla en el Valle del Usumacinta (Guatemala y Mexico 1942) [Absence of Yellow Fever in the Valley of the Usumacinta Guatemala and Mexico 1942]—*Rev Inst Salubridad y Enfermedades Trop Mexico* 1942 Dec Vol 3 No 4 pp 255-271 With 2 maps (1 folding) & 14 figs on 4 plates English summary

During April and May 1942 an international Commission made up of representatives of the National Health Departments of Mexico and Guatemala and a staff member of the Rockefeller Foundation undertook an investigation along the valley of the Rio Usumacinta which lies in the Yucatan Peninsula. The main objective of the Commission was to collect blood specimens for yellow fever immunity tests but some studies were made of the mosquitoes along their route and observations on the prevalent human diseases were made and are reported. The Usumacinta Valley which appears to offer favourable conditions for the occurrence of jungle yellow fever had not been included in the immunity survey carried out in Mexico and Central America in 1932 1934 and 1936 by SAWYER BAUER and WHITMAN [see this *Bulletin* 1937 Vol 34 p 680].

A total of 806 individuals were bled the sera being sent to the Laboratories of the International Health Division of the Rockefeller Foundation in New York City for the mouse protection test. The persons selected were those who had never moved away from the region and who were most likely to have had intimate contact with the forest. All ages from four years upwards were included though the great majority were under twenty years. Only twenty seven of the sera protected mice and were therefore considered to have come from persons immune to yellow fever. The youngest person with a positive serum was twenty nine years of age. These results indicate that yellow fever has not been present in this area for many years. The last reported clinical case of yellow fever occurred in Mexico in 1923. The most common diseases seen among the population of the Usumacinta Valley were malaria hookworm and other intestinal parasites. Pinta tuberculosis and cutaneous leishmaniasis. The people were generally malnourished and various signs of avitaminosis were frequently observed. The authors give no details of the deficiency diseases encountered.

A classified list of the mosquitoes collected is given. It is of interest that *Anopheles darlingi* was captured in four different localities as this efficient vector of malaria had not previously been reported in this region.

Hugh H Smith

[June 1943]

CHOLERA

BANERJEE (D N) Concentrated Saline in the Treatment of Cholera (a Preliminary Report) — *Jl Indian Med Assoc* 1942 Nov Vol 17 No 2 pp 39-42 With 2 figs

The author's contention is that hypochloræmia is a much more important factor than loss of fluid in cholera burns pyloric obstruction toxæmia of pregnancy etc. He administers a highly concentrated solution of salt intravenously and in comparatively small volume. The effect he contends after administration of concentrated saline appears to be due to drawing in of the interstitial fluid into the circulation which exists in normal condition in a proportion of 3 to 1 while the blood fluid 5 per cent of the total body weight. Five cholera patients have been treated with encouraging results. It was found that a quantity no greater than 50 cc of a 20 per cent salt solution given intravenously rapidly lowered the specific gravity of the blood and was equal in effect to 3 pints of hypertonic saline. In cholera therefore there may be more importance attachable to loss of salts than of fluids.

W F Harley

CHAPMAN (Cicely J) The Use of Rabbits for the Detection of Pyrogenic Substances in Solutions for Intravenous Administration — *Quarterly Jl Pharm & Pharmacol* 1942 Oct-Dec Vol 15 No 4 pp 361-366

Intravenous injection of some solutions is apt on occasion to produce a pyrogenic reaction which is exhibited clinically by fever chill nausea vomiting and leucopenia. This reaction has been shown to be due to some constituent of the water used and it is very important to be able to certify a solution as pyrogen free. Rabbits have been used as test animals in the present investigation and the two tests were (1) production of a temperature reaction and (2) leucopenia. It was very essential to train the animals to become used to manipulations as well as the tests themselves for apprehension may of itself produce reaction. All these precautions were taken as also as the precaution of estimating a mean resting leucocyte count for seven of the rabbits before the investigation started. The smallest fall in the circulating leucocytes which was given by a solution known to be pyrogenic was about 4 000 so that a fall of 4 000 or more in the mean of the counts taken 45 and 90 minutes after injection is considered to be a minimum reactive leucopenia although the drop is usually greater than this. Control solutions of 5 per cent dextrose did not in any case give rise to a leucopenia. The temperature of the animals used as also well controlled and it was found especially in the later experiments that the temperature rise was closely correlated with leucopenia. Although occasionally a high temperature occurred with no leucopenia. A mean temperature rise of 1.34 C was produced by seventeen solutions which caused leucopenia while a mean rise of 0.5 C occurred in fifty experiments in which there was no leucopenia. Thus the conclusion is reached that with rabbits as test animals a marked leucopenia accompanies the fever reaction which occurs on injection of pyrogen-containing solutions. In the absence of this leucopenia the solution is stated to be free from pyrogens.

W F Harley

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

BELTRAN (Enrique) Protozoarios intestinales del hombre en la Republica Mexicana [Intestinal Protozoa of Man in the Republic of Mexico]—*Rev Inst Salubridad y Enfermedades Trop Mexico* 1942 June Vol 3 No 2 pp 161-167 With 1 map [13 refs] English summary (6 lines)

A number of investigators including the author of the paper under review have published the results of their examinations for intestinal protozoa of groups of the inhabitants in different parts of Mexico. The author considers these various records which indicate that in certain districts as many as 86 per cent of the population harbour one or other of the common intestinal protozoa and 40 per cent *Entamoeba histolytica*. The incidence of *E. gingivalis* infections is also high as in two groups examined the infection rates were 25 and 34 per cent.

C M Wenyon

DESCHENS (R) Nouvelles données sur la relation existant entre l'encystement et la conservation du pouvoir pathogène des amibes dysentériques en culture [Further Information on the Relationship of Encystment to the Maintenance of Pathogenicity in the Dysentery Amoebae]—*Ann Inst Pasteur* 1941 Dec Vol 67 No 6 pp 468-470

In a previous paper [this *Bulletin* 1938 Vol 35 p 584] the author recorded experiments which indicated that the pathogenicity of *Entamoeba histolytica* when cultivated outside the body quickly diminished unless periodic encystment was induced by the addition of starch to the cultures. The pathogenicity was tested by inoculation of measured quantities of culture into the large intestine of cats through a laparotomy opening. It has since been established that the maintenance of pathogenicity is independent of the associated bacteria. In the present paper further experiments are described. From a certain strain of amoebae the pathogenicity of which was such that 75 to 83 per cent of inoculated cats contracted amoebic dysentery a line was maintained under conditions of culture which did not permit of encystment occurring. At the same time the original strain was carried on as before periodic encystment being induced. After three years of cultivation under these conditions the two strains were tested for pathogenicity. The original strain produced amoebic dysentery or colitis in 80 per cent of the cats inoculated while the new line was tested twice. At one test only one of twenty cats became infected while at the second test all of twenty cats were refractory. It thus seems clear that the pathogenicity of *E. histolytica* is maintained only if encystment is made to take place from time to time. This is perhaps not surprising as periodic encystment of the amoeba is a feature of its life history in its natural environment.

C M Wenyon

RODANICHE (Emil C) & KIRSNER (Joseph B) The Effect of Sulphonamide Compounds on the Growth of *Entamoeba histolytica* in Culture—*Jl Parasitology* 1942 Dec Vol 28 No 6 pp 441-449

The action of sulphonamide compounds on the growth of *Entamoeba histolytica* was tested by adding crystals of the drugs to the culture

tubes so that the liquid became saturated with them. The compounds tested comprised sulphanilamide, sulphapyridine, sulphathiazole, sulphaguanidine and sulphadiazine. The medium used was a modification of that of Cleveland and Collier in which the liquid part of the medium was replaced by a mixture of one part of sheep serum and seven parts of Locke's solution without dextrose. The stock cultures grew luxuriantly in this medium. In most cases the addition of the drug, especially sulphanilamide, to the medium inhibited growth, though in some cases growth continued for longer periods than in the controls. In the case of sulphadiazine and some of the other drugs crystals were ingested by the amoebae which did not appear to be inconvenienced in any way by their presence. Culture medium containing the drugs allowed of excystation, though in some cases this was delayed. It is clear from the results obtained that the sulphonamide compounds are not encouragingly active against the dysentery amoebae, but in the opinion of the authors they merit clinical trial in amoebiasis.

C. M. Henyon

LINICOME (David Richard). Fluctuation in Numbers of Cysts of *Entamoeba histolytica* and *Entamoeba coli* in the Stools of Rhesus Monkeys.—*Amer Jt Hyg* 1942, Nov, Vol 36, No 3, pp 321-337. With 3 figs. [29 refs.]

A series of observations was carried out on two rhesus monkeys which were found to be naturally infected with *Entamoeba histolytica* and *Entamoeba coli*. It was first confirmed that on a diet rich in carbohydrates, consisting of 400 grammes of strained whole banana daily, the growth of the amoebae in the intestine was favoured. Observations were made on alternate days, the number of cysts being estimated for the total faecal matter passed during the previous 24 hours. For this purpose the faecal matter was emulsified and the number of cysts in measured quantities of the emulsion was counted. In addition the quantity of moisture in the faeces was estimated by drying and weighing measured samples. It was found that maximal numbers of cysts were eliminated approximately every seven days, the range of the cycle varying from four to ten or even as long as fourteen days. The cycles of the two amoebae were independent of one another but in all cases the cysts of *E. coli* were more numerous than those of *E. histolytica*, hence the chance of finding cysts of the former was always greater than it was for *E. histolytica*. The number of cysts of the two forms bore no relationship to the quantity of moisture in the faecal matter. When the diet was altered by substituting 25 grammes of pure vitamin free casein for 100 grammes of banana, the number of cysts found was reduced. Season has little if any influence on the cyst elimination.

C. M. Henyon

REES (Charles W.), BOZICEVICH (John), REARDON (Lucy V.) & JONES (Frances). A Preliminary Note on the Complement Fixation Test for Amoebiasis with Antisera Prepared from *Entamoeba histolytica* grown with a Single Species of Bacteria.—*Amer Jt Trop Med* 1942, Nov, Vol 22, No 6, pp 581-586.

A method of obtaining cultures of *Entamoeba histolytica* in the presence of a single bacterial species only, having been devised [this Bulletin 1942, Vol 39, p 765] it was decided to prepare antisera of

E. histolytica from such cultures with a view to comparing the results of complement fixation tests with those obtained with antigens prepared from cultures in which numerous and varying species of bacteria are present. It was felt that with a single bacterium the influence of its presence would be more easily estimated. The amoebae were grown in flasks containing 25 cc of egg base overlaid with 50 cc of Locke's solution with 0.1 per cent of dextrose and maltose. 3 grammes of ground eggshell as buffer and 120 mgm of rice flour. The bacterium present was one previously identified as *Leptotrichia buccalis* and now referred to as organism *t*. In preparation of the antigen the liquid from 20 flasks was centrifuged the deposit being left in a volume of 50 cc. After further centrifugation a sediment containing amoebae bacteria and rice starch is obtained. This is washed several times in Locke's solution and the sediment finally taken up in 20 cc of this solution. These concentrates have been found to contain 600 000 to 4 000 000 amoebae per cc. The suspension is frozen for four hours and then thawed at 10 C. The liquid cleared of sediment by centrifugation is the finished antigen. This is stored at 10 C.

Preliminary tests carried out with the serum of rabbits immunized against *E. histolytica* organism *t* and the components of the culture medium showed that a minimum of the organism *t* antigen and no component antigen was present in the *E. histolytica* antigen. Complement fixation tests were then carried out with human sera from cases diagnosed as or suspected of being due to *E. histolytica* infections. In the most satisfactory series from Baltimore where experience had shown that the statements regarding presence or absence of amoebic infection could be thoroughly relied upon the complement fixation test agreed with the diagnosis in 34 of 35 cases. In this series there were six positive complement fixation reactions in sera from five cases with positive stools one of which also had hepatic abscess and from one case of amoebic hepatic pulmonary abscess. From the results so far obtained it is concluded that the antigen prepared from *E. histolytica* and organism *t* possesses marked specificity and a high degree of potency.

C M Wenyon

HERMANN (Harold B) & BERMAN (Leonard S) Penile Ulcer caused by *Endameba histolytica*—*Jl Amer Med Assoc* 1942 Nov 14 Vol 120 No 11 pp 827-828

The authors have found only one record of amoebiasis of the penis in the literature [SHIH *et al* this *Bulletin* 1940 Vol 37 p 122] they now report a second. The patient a white United States soldier was a native of Florida where amoebiasis is endemic. He noticed a white spot which gradually enlarged to an ulcer one centimetre in diameter on the undersurface of the glans. The spot first appeared 7 days after sexual exposure. At that time Ducrey's bacillus was isolated and later the Wassermann became positive. The lesion would not heal but spread considerably. The patient was marked and in an attempt to divert the urinary stream so as to facilitate healing suprapubic cystotomy was performed. Biopsy showed non specific inflammation only the exudate and the stools were negative for *E. histolytica* until 5 months after admission when the protozoon was found in the faeces. Treatment with emetine and carbarsone was ineffective and while these drugs were being administered the ulcer exudate was found to contain myriads of cystic forms of *E. histolytica* which were grown

in culture. Carbarsone was then applied locally as a 0.5 per cent solution with the result that the healing process set in and continued uninterruptedly to complete cure.

The penile infection was probably secondary to the intestinal infection and was a result of bad hygienic habits. The authors point out that amoebiasis should be borne in mind in cases of chronic phagedaenic ulceration of the penis.

C. IF

CAMERON (J. D. S.) & LAWLER (N. A.) Aspiration, Air Replacement and Radiology in the Diagnosis and Prognosis of Hepatic Abscess — *Jl Roy Army Med Corps* 1943 Jan Vol 80 No 1 pp 1-4 With 3 figs

Aspiration in combination with injections of emetine forms an integral part of treatment of amoebic abscess of the liver. Surgical drainage should be reserved for those cases in which mixed infection has occurred. Aspiration as here described can be usefully employed in combination with air replacement.

The site of election for aspiration is in the 8th to 10th interspaces in the mid axillary line. Local bulging is helpful in the choice of site but is present only when the abscess is large and aspiration has been too long delayed. Localized tenderness is looked for and the discovery of such a point should lead to its choice for puncture. For aspiration a two-way syringe with wide bore needle 3½ to 4 inches in length is preferred to Potain's aspirator though the needle provided with that apparatus proved satisfactory.

Premedication consisted of administration of morphine gr ½ and byoscine gr 1/100. Thereafter local anaesthesia proved sufficient by superficial and track infiltration down to the surface of the liver.

Following aspiration of as much pus as could be evacuated air was forced in until pain was complained of either in the liver or in the right shoulder. Replacement with air to half the volume of pus evacuated sufficed.

Prior to aspiration the patient should be screened in the erect position. Suggestive findings are a high right diaphragm, local bulging of the right cupola, rough or blurred outline of the right diaphragm, shadowing of the right costo-phrenic angle indicating effusion. These signs are not absolutely diagnostic of hepatic abscess and are more constant in subphrenic abscess but the latter usually contains gas.

Examination following aspiration and air replacement should be carried out on the day after tapping. Three radiograms should be taken after screening—in the antero-posterior position erect, in the lateral position erect, in the antero-posterior position with the patient lying on his left side. The cassette is placed vertically behind the patient and the central ray is directed horizontally through the required area and at right angles to the plane of the film. The three radiograms determine the position, size and shape of the abscess cavity.

The air outlines the upper part of the abscess and by superimposing the films a correct assessment of the complete size and outline can be obtained. An estimate of residual pus is thus easily made.

Examinations should be repeated a fortnight after the aspiration and thereafter at convenient intervals to determine shrinkage of the abscess cavity and absorption of residual pus.

The air is not absorbed for upwards of a month and the need for further aspiration is thus determined so that air replacement can if necessary be again carried out

This method has been applied to twelve cases of hepatic abscess with favourable results. In all amoebae were absent from the pus and in three only were cysts found in the faeces P Manson-Bahr

BELTRAN (Enrique) & LOPEZ PORTILLO (Silvestre) Presencia de tricomonadinos hematofagos con cinco flagelos en un caso de disenteria [Blood Ingesting Trichomonads in a Case of Dysentery] —*Rev Inst Salubridad y Enfermedades Trop* Mexico 1942 June Vol 3 No 2 pp 153-159 [18 refs] English summary (7 lines)

The case described is that of a man 52 years of age a native of Mexico who developed an uncontrollable dysentery which proved fatal. Bacteriological examinations failed to reveal any cause of the disorder which is considered to have been due to the presence of a trichomonas which possessed five flagella and was ingesting red blood corpuscles. It was not possible to perform an autopsy so that other possible causes of the dysenteric condition could not be excluded C M Wenyon

DIAZ (M Pujadas) Lambliasis Su tratamiento Informes de casos [Treatment of Giardia Infections] —*Bol Asoc Med Puerto Rico* 1942 Oct Vol 34 No 10 pp 368-370

It is stated that Giardia infections are very common in Porto Rico and that they give rise to a variety of symptoms which are referable to a gastro-enteritis. Three illustrative cases in children from 3½-8 years of age are briefly described. In all of these the infection was eradicated by atebryn treatment. The dose of the drug varied from 0.15 ggm to 3 ggm daily for three to five days C M Wenyon

FERRI (L. V.) Contribution to the Epidemiology of Balantidiosis — *Med Parasit & Parasitic Dis* Moscow 1942 Vol 11 No 3 pp 108-112 [In Russian]

The author describes an outbreak in a mental hospital at Tomsk [Siberia] of severe colitis and dysentery. While some of the cases of intestinal disorder were due to bacillary dysentery in others *Balantidium coli* was incriminated. Examination of the rectal mucus and faeces of the adult patients revealed upwards of 20 cases of balantidiosis seven of which terminated fatally. [The total number examined is not stated but it can be gathered that they exceeded 130.] It was also established that many of the patients worked on a pig farm attached to the hospital.

Attention was then directed to the children resident in the hospital among 68 there were six severe cases of balantidial dysentery and five symptomless carriers.

In view of the fact that all the cases in children occurred in the same ward and taking into consideration the unhygienic habits of mental patients who often indulge in coprophagy the author believes that the infection in the hospital was transmitted mainly from man to man. And since cysts were absent from human faeces it is suggested that

June 1943

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transmission takes place in the active ciliate stage. In support of this view it is pointed out that the survival of the ciliates in the stomach is facilitated by achylia—a condition commonly observed in patients suffering from balantidiosis.

In conclusion attention is drawn to the danger of dissemination of balantidiosis in closed institutions. To obviate this risk the following precautions are recommended: (1) faecal examination of all newly admitted patients and of those inmates who are suffering from colitis; (2) prevention of contact between the patients and pigs; and (3) avoidance of pig manure in vegetable gardens cultivated by the inmates.

C. A. Hoare

BELTRAN (Enrique) Incidencia de *Balantidium coli* en Tabasco. Hex
[Incidencia de *Balantidium coli* in Tabasco]—*Rev. Inst. Salubridad*
Enfermedades Trop. Mexico 1941 Dec. Vol 3 No 4 pp
319-321 English summary (8 lines)

In a previous paper the author reported 23 cases of human balantidiosis known in the Republic of Mexico. They were gathered from a careful perusal of the available literature as well as from personal communications of several laboratory workers. After that paper Piza BIANO and GRANIER of Tabasco had found 36 new cases some of them personally checked at the author's laboratory. The total number of *Balantidium coli* infections in man reported up to date in the country reaches 59.

RELAPSING FEVER AND OTHER SPIROCHAETOSSES

CLASTRIER (J.) Étude expérimentale de deux souches de *Spirochaeta*
hispanica isolées en Algérie. An Experimental Study of Two
Strains of *Spirochaeta hispanica* Isolated in Algeria]—*Arch. Inst.*
Pasteur d'Algérie 1941 June Vol 19 No 2 pp 228-239
With 3 figs

The author gives clinical details of three cases of Spanish North African relapsing fever occurring in Algeria during 1938 from two of which strains of spirochaetes were isolated by inoculation of the patient's blood into guinea-pigs. Numerous larvae and nymphs of the *Ornithodoros erraticus* were found in the neighbourhood of the house occupied by one of the patients but these produced no infection in guinea-pigs or rats and all attempts to determine the source of the infection were negative. The two strains referred to respectively as Tefeschoum and El Kettar after the villages from which the patients came were studied in the laboratory animals and found to belong to the species *Spirochaeta hispanica*. Cross immunity tests showed that the two strains differed slightly in their immunity reactions but belonged to the same group. The strain produced latent infections in the brains of infected rodents which persisted in one rat for 470 days after the spirochaetes had disappeared from the blood.

E. Hindle

SAUTET (Jacques) Étude d'un spirochete du groupe *Sp. hispanica* de Buen 1926 agent causal de la fièvre récurrente libano syrienne [The Study of a Spirochaete belonging to the Group *Sp. hispanica* de Buen, 1926, the Causal Agent of Libano Syrian Relapsing Fever]—*Arch Inst Pasteur d'Algérie* 1941 June Vol 19 No 2 pp 240-247 With 1 chart [18 refs]

The author mentions [*Soc Med Marseille* 27th November 1940] that he had effected the transmission of the strain of relapsing fever occurring in Syria and the Lebanons by mean of the bite of all stages of *Ornithodoros tholozani* and now gives an account of the principal characters of the spirochaete leading to its determination as *S. hispanica*.

The strain was obtained from infected *Ornithodoros* found in a cave near Damascus where various French soldiers had become infected.

The type of relapsing fever produced is very severe lasting for about 5 months with 4 to 6 febrile attacks accompanied by meningitic symptoms in all the five patients under observation. In guinea-pigs the infection varied in its intensity producing a mortality of 10 to 30 per cent. After the spirochaetes disappeared from the blood they persisted in the brain for at least 76 days. Rats and mice were also susceptible but the infections were much less severe than in guinea-pigs.

From its general characteristics including the results of cross immunity reactions the author considers that this spirochaete belongs to the large Spanish Asiatic group and calls attention to the fact that the distribution of this group of spirochaetes corresponds with that of the Arab Mohammedan conquest. This supports the hypothesis that *S. hispanica* is of Asiatic origin and was carried to North Africa and Spain during the campaigns.

E Hindle

HAMILTON (J. B.) Ocular Complications in Relapsing Fever—*Brit Jl Ophthalm* 1943 Feb Vol 27 No 2 pp 68-80 [10 refs]

Some interesting observations on the occurrence of ocular complications in relapsing fever in the Middle East have been recorded by Hamilton MACKENZIE during an epidemic of the disease which occurred a century ago noted iritis and amaurosis as common complications. In an Australian General Hospital Hamilton saw twenty eight cases of relapsing fever from the Western Desert of whom four developed uveitis and sixty three cases from Syria none of whom had eye trouble. The ocular complications met with were acute iridocyclitis and chronic cyclitis associated with persistent headache. Gross vitreous exudate was a marked feature in both forms. The headache is attributed to an encephalitis. Sufferers from iridocyclitis developed massive posterior synechiae which were readily broken down by mydriatics. Despite the cyclitis and vitreous changes no choroiditis was observed and the prognosis as regards vision is stated to be remarkably good. In all the cases the eye complications were unilateral though this may not be a universal experience. An important point is that these complications are delayed and the cause may therefore sometimes escape recognition.

Other complications were facial paralysis herpes febrilis and encephalitis. In some cases the facial paralysis appeared to be permanent. The author suggests that the Syrian fever is tick borne and the Western

Desert fever is louse borne and that this may explain the greater liability of the latter to cause ocular complications. He estimates that 20 per cent of Western Desert cases may be expected to develop uveitis
H Kirkpatrick

RIEL (J.) La leptospirose en Afrique [Leptospirosis in Africa]
—Rec Travaux Sci Méd Con o Bde Léopoldville 1942
Jan No 1 pp 7-22 [64 refs]

The author gives a useful summary of the occurrence of leptospiral infections in Africa which have been recorded from various parts of north and tropical Africa but none in the south of the continent. A special section is devoted to the Central African focus of the disease the existence of which was established by the author in the region of Lake Kivu [see *Bulletin of Hygiene* 1940 Vol 15 p 174]. Six strains of *Leptospira* were isolated and tested against known strains obtained from the Prince Leopold Institute of Tropical Medicine Antwerp. They were found to belong to four groups or *L. canicola* typical *L. icterohaemorrhagiae* (Weil's Disease) a strain serologically distinct but related to the latter and finally an entirely distinct strain. All these strains showed considerable variation in their pathogenicity but clinically the most striking feature was the frequency of meningitic symptoms. There is presumptive evidence in favour of the dog being one of the reservoirs of virus in the Kivu region. With regard to rodents the examination of 104 domestic rats *Mastomys coucha* and 162 wild rodents belonging to eight species gave uniformly negative results.

The diagnosis of the disease must depend on critical serological tests for many cases are benign show no signs of jaundice and are difficult to distinguish from various other local diseases such as yellow fever relapsing fever dengue etc. Attempts to isolate strains of the virus in guinea pigs may not succeed owing to the feeble pathogenicity of the organism
E Hindle

LEPROSY

MUIR (E.) Report on Leprosy in Jamaica — *Leprosy Review* 1943
Jan Vol 14 No 1 pp 4-17 With 6 maps

This is a report on a visit made at the request of the Medical Adviser to the Comptroller for Development and Welfare in the West Indies. The Leper Asylum at Spanish Town is of the old prison life type with little land it is overcrowded and there is no segregation of lepromatous from early neural cases. The only modern feature in the institution is the provision of six members of a religious sisterhood 10 years ago at Muir's suggestion. All the 172 inmates had been compulsorily isolated and they included 105 lepromatous and mixed cases 38 neural and 29 with disease arrested. The latter might be released to live near their relations with some financial assistance with advantage. Inquiries into the history of infection showed that some had contracted the disease abroad. A spot map shows that in rural areas leprosy is a focal disease. The unrevised leprosy law of 1896 requires amendment as some of the provisions are at variance with the Public Health Law

of 1942 Recommendations for the introduction of more modern methods of leprosy control are made

L Rogers

- i MUIR (E) Report on Leprosy in Barbados — *Leprosy Review* 1943 Jan Vol 14 No 1 pp 18-24
- ii ——— Report on Leprosy in St Lucia — *Ibid* pp 25-29
- iii ——— Report on Leprosy in St Kitts and Nevis — *Ibid* pp 29-33
- iv ——— Report on Leprosy in Antigua — *Ibid* pp 33-39

Muir's report on his inquiries in the smaller West Indian Islands can be dealt with more briefly for his recommendations are similar to those for Trinidad and Jamaica and only the epidemiological data need therefore be mentioned

i In Barbados at the end of 1941 56 cases were accommodated in a fenced in lazaretto with a site of 32½ acres The numbers have steadily fallen from 173 in 1924 and the admissions from an average of 6·7 in the first seven years to 3·6 in the last five Discharges have also fallen to one third of the former rate owing to the favourable cases recovering early and leaving mostly irrecoverable cases which produce a depressing atmosphere Muir does not find any definite evidence of an actual decrease of the disease for voluntary early admissions for treatment are very rare the disease is easily hidden and only begging lepers and those plying certain trades can be compulsorily isolated Moreover the local doctors are unanimous that there are a great many leprosy cases at large and that the present control system is quite inadequate Muir advises the introduction of modern methods including a survey and arrangements for treating early cases apart from incurable ones His data of the incidence in different parishes are of local interest only

ii In St Lucia the majority of the known cases of leprosy are segregated in a home close to the poor house The wards are dark and gloomy and hold 29 cases It was found that six had resided in Guiana and 12 more had indirect contact with that highly leprous country through relatives Instances of contact infection are quoted Many of the infectious severe cases had been potential spreaders of infection for months and years before their discovery and internment Leprosy should be borne in mind during the examination of school children

iii In St Kitts and Nevis 48 lepers were isolated in a leper home 38 of whom were still in an active stage of the disease 24 were in stage L3 In addition 21 are allowed to live at home six being arrested cases residing near the home There are probably many undiscovered neural cases in the islands but only one was detected during the examination of six schools The head of the leper home should receive special training at the Trinidad settlement The leper ordinance should be relaxed to allow early cases to be treated as out patients

iv Antigua has 38 cases in a home of which 20 are not infectious Many others are allowed to reside in their own homes A survey is required

L Rogers

MUIR (Ernest) Leprosy Control in Trinidad — *Caribbean Med J* 1942 Vol 4 No 3 pp 83-91

This is a report on surveys of leprosy distribution in Trinidad and Tobago with recommendations for its control No previous survey

HELMINTHIASIS

MARILL (François-Georges) ALCAY (Louis) & Musso (Jean-Claude)
 Contribution à l'étude épidémiologique des foyers marocains de
 bilharziose urinaire du Tafilalet du Draa et du Sous. Leur
 importance comme source de diffusion de la schistosomiase [A
 Contribution to the Epidemiological Study of the Moroccan Foci of
 Urinary Schistosomiasis in the Regions of Tafilalet and the Oneds
 (Rivers) Draa and Sous. Their Importance as a Source of Diffusion
 of Schistosomiasis.]—*Bull Inst Hy Maroc* 1940 Vol 10
 pp 5-16 25 refs.]

In 1939 the authors studied schistosomiasis at Saint Aime-de-la
 Djidjoudia in the Oran Department of Algeria, to which nomad gangs
 of agricultural workers come from the Saharan side of the Great Atlas
 Range. These men return as often as they can to their native villages
 where the snail intermediate hosts of schistosomiasis are abundant.
 They are a menace to the whole of Algeria, probably they are responsible
 for the Gharb focus in Northern Morocco. Outside Morocco they
 have now probably contaminated an area previously uninfested,
 namely the Bas-Chelif plain with its system of irrigation canals fed
 by the River Chelif. Some authorities think that Senegalese troops
 quartered at Orleansville have contaminated these canals but the
 authors favour the other hypothesis that they have been contaminated
 by Moroccan workers using the canals for bathing etc. Examination
 of these nomad workers done by the authors suggests that the Saharan
 side of the Great Atlas range is a vast focus of urinary schistosomiasis.
 The spread of the infection is favoured by the water system in use
 there and by the migrations of workers which are helped by the good
 transport and means of communication. The danger seems the
 greater because the examinations carried out by the authors were not
 done systematically by concentration or centrifugation methods, the
 inference being that these methods would reveal an incidence still
 higher than that actually found. Even by their methods they found
 that out of 119 of these nomad workers in various centres 30 were
 passing eggs of *Schistosoma haematobium* and 23 showed blood in the
 urine by microscopical examination. Yet all these men except one
 claimed to be in good health. In some areas the percentage of infested
 workers was high e.g. in Goulmima and Tinejdad. The authors
 could not prove that the workers examined had been infested at their
 native villages but this is the most likely hypothesis.

Discussing preventive measures the authors say that the problem of
 protecting Morocco will be difficult because it is not easy to alter the
 migrations of these workers which are traditional and dictated by
 necessity. For the protection of Algeria the most radical and im-
 portant measure is the closure of the frontier between Algiers and
 Morocco to the Moroccan workers. But individuals would filter
 through and the Moroccan people especially those of the south whose
 means of existence is already precarious would suffer. The labour
 market of Algeria would also be upset and deprived of the excellent
 quality of the work done by the nomad Moroccan gangs.

A second possible measure would be reservation of the franchise
 of Moroccan workers to those who came from certain zones only
 which are free so far as is known from schistosomiasis e.g. the Riff
 the Taza region and the Middle Atlas. Such a measure would be

imperfect because all Morocco has not been examined for schistosomiasis and there is no guarantee that nomad Moroccans from uninfested areas have not become infested elsewhere. A third measure is to allow only those Moroccans known to be free from the disease to enter Algeria. This would require the organization of centres for the examination and treatment of the workers in Moroccan territory. Workers should submit to cystoscopy and examination of the urine both when they leave Morocco and when they return to it [but see BARNEAUD & GAUD below]. Such centres should resemble the hospitals for bilharzia patients which have done such good service in Egypt except that they would be placed at the points of transit of the Moroccan immigrants who would have to pass through them or be sent back from Algeria. Probably some parts of Algeria favour schistosomiasis more than others do. Algerian zones in which the climate resembles that of the Sahara favour the disease. Their irrigation canals modifying the biological factors by creating permanent fresh water collections in places which were arid before in these intermediate hosts find good conditions for their life and individuals passing eggs are the only other factor required. This factor was supplied at Saint Aume de la Djidjoulia when the Moroccan workers came to that region.

Especially to be feared is the arrival of infested persons in the irrigated Algerian plains. All Moroccan workers should be forbidden to stay in these areas *eg* the plains of Bas Chélif Relizane and Perregaux. Their entry into other areas served by water barrage systems in Algeria may have to be prohibited. Malacological investigations of systems of canals like these may not reveal the intermediate hosts until some years after these have become established. At Saint Aume the authors could not find the intermediate hosts in the natural waters of the Bas Chélif plain but 8 years after the construction of the irrigation canals was begun they found the snails on the stonework of the canals. Combinations of all these suggested measures would increase their efficacy. The real problem is the protection of North Africa and its solution depends on the co ordination of medical men and the governments concerned.

G Lapage

ALCAY (L) MARILL (F G) & MUSSO (J C) Le foyer de bilharziose urinaire de Saint Aume-de la Djidjoulia (departement d Oran-Algerie) (The Focus of Urinary Bilharziasis at Saint Aimé de la Djidjoulia (Department of Oran Algeria))—*Arch Inst Pasteur d Algérie* 1942 Mar Vol 20 No 1 pp 39-99 With 19 figs on 8 plates & 5 text figs [Refs in footnotes]

This long and detailed study of the Saint Aume focus amplifies the authors' earlier paper (above). It gives details of the incidence of bilharzia in the European and native population in this area and of the occurrence and distribution of the snails and ends with suggestions for prophylaxis and treatment. The physical characters of the rivers and streams and of the irrigation system are described in detail with sketch maps and good photographs. Examination of the natives showed the importance of this focus which is at present restricted to the Saint Aimé area but is showing a tendency to spread by means of the constant interchange of people among the villages. Its origin is recent the first cases of haematuria

having been noted in 1935 a year after the irrigation system began to operate in the district. The creation of this system has provided an immense habitat favourable to the snail intermediate hosts. The snails found are listed as *Bulinus contortus*, *B. contortus raymondi*, *B. contortus brochi*, *B. contortus truncatus* and intermediate forms between *contortus* and *contortus brochi* and between *contortus* and *contortus raymondi*. These were the most numerous snails. *Physa acuta* and a species doubtfully diagnosed as *Hydrobia brondeli* were also very numerous but *Physa acuta* var. *subopaca* was rare. Of the species of *Bulinus* 57 were examined but none of these was infested with cercariae. These 57 were however taken too far away from the centre of the focus and the authors think that more snails should be examined before conclusions are drawn about the degree of their infestation. They give detailed reports of their malacological studies and of their physical examinations of the waterways and suggest that only the River Chelif itself provides conditions suitable for the snails and that this river can be only a temporary habitat for them. In the other streams and natural waters of the Bas-Chelif plain they found practically no intermediate hosts so that these natural waters need not be feared as sources of the disease. Attention can be concentrated on the irrigation system.

The eggs of *Schistosoma* come chiefly in the authors' opinion from the Moroccan workers from the infested areas of the Sahara south of the Great Atlas range (see preceding abstract). Out of 119 of these workers examined 45.7 per cent. were infested. The Senegalese troops at Orleansville may be an additional source of eggs. Out of 115 of these examined 11 were passing eggs and 29 had microscopic haematuria. Cystoscopic examination showed that 80 per cent. of them had vesical bilharzial lesions which were often very extensive. Almost all the urine from their barracks eventually finds its way into the River Chelif. The authors examined the sanitary arrangements at the barracks and concluded that it is not impossible but difficult for miracidia to survive long enough to infest snails 90 km. away in the canals of the Saint-Aune region which are fed by the River Chelif. The urine of the townspeople of Orleansville also reaches the Chelif.

The destruction of snails in the canals which are their main habitat should be easy because the canals can be emptied and refilled in a maximum time of 48 hours and can then be cleaned. This was done twice in July 1939. Much cleaning was again done in 1940 and early in 1941 and after it snails were rare. Recently the barrage has been heightened and the rate of the current in the canals has been increased. These and other measures have improved irrigation and have helped to destroy the snails. A better plan would be to carry out special cleaning in May-July when the snails are reproducing and to treat the matter removed with copper sulphate. The whole contents of the canals should be treated with 1,500,000 copper sulphate or ammonium sulphate which kills the snails and is also a good manure could be used. But results of these measures will be only temporary unless the centre from which the snails come is found and destroyed.

Regarding the Senegalese soldiers the authors quote the recommendations of RAYNAUD [Bull. San. d'Algerie 1939 Vol. 34 p. 291] that the theoretically perfect but impossible solution is to send to Algeria only Senegalese who are found by cystoscopic examination to be free from the disease before they leave Dakar. Other measures are insistence on the importance of bilharzia, restriction of immigration into Algeria.

to people from non infested or feebly infested areas recall of Senegalese garrisons stationed in towns on the coast construction of sanitary facilities in the barracks which do not foul the waterways prevention of fouling of the waterways when the soldiers are guarding or working on them and the systematic treatment of the Senegalese and repatriation of severely infested individuals Raynaud recommends strict measures for the Moroccan workers Workers from the southern side of the Great Atlas should be forbidden to stay within the perimeter of the irrigated areas those from the Riff and frontier areas could be exempted because they are so far free from the disease Among other measures recommended by the authors are prohibition of bathing in the canals strict rules for the irrigation workers who should be given rubber boots and gloves and propaganda about the disease CARROSSE recalls Mahomet's injunction to Mohammedans not to foul stagnant water with urine nor to wash in water thus fouled Advantage could be taken of this religious injunction

G Lapage

BARNEAUD (J) & GAUD (J) La bilharziose vesicale dans le territoire du Tafilalet [Vesical Schistosomiasis in the Tafilalet Territory]—*Bull Inst Hyg Maroc* 1940 Vol 10 pp 17-29 With 3 figs [Bibliography]

The authors have verified the statement of MAPRILL ALCAÏ and Musso (above) that the palm groves of the Tafilalet region are infested with bilharzia This region is isolated from Atlantic influences by mountains to the west and its climate is Saharan It is traversed from north to south by the Oueds (rivers) Guir Ziz and Gheris which are its only agricultural water supply Periodically they are in spate or receive water from subterranean streams and this water is led off to the palm groves by a network of canals Such a water system favours the snails and human contamination by cercariae

In this area 1319 people were examined but the percentage of infested people was based on only 1126 all Mohammedan boys aged 7-15 years Indexes of infestation however which are based only on the examination of children and adolescents are higher than those based on the whole population adults being less often infested than children girls than boys and Jews than Mohammedans The authors figures confirm the views of Marill *et al* The highest figures were obtained in the regions of the Oueds Gheris and Ferkla *et al* 74 per cent at Tourong and 80 per cent at Ighi The maximum figure obtained at Ighi is related to abundant water from irrigation works there as at Saint Aime de la Djidiouia in Algeria At Tinejdad where the minimum figures were obtained water is scarce In the valley of the Oued Ziz their figures were 5 egg carriers out of 164 children at Kasr es Souq and 32 out of 107 children at Erfoud Infestations were low along the upper part of the Ziz at altitudes above 1000 metres The highest infestation was at Aoufous in its middle reaches and infestation decreased from this along its lower reaches where water was less abundant At Abou Denib on the Oued Guir their figures were 18.5 per cent among Mohammedan children and 28.5 per cent among young Jews Their studies of the snails were done in April when conditions were less favourable for such a study Intermediate hosts were found in only 2 places 1. *Bulinus contortus* ray, 2. *B. p. d.* abundant at Goulmuma (R Gheris region)

and *B. contortus* very rare at Tinejdad (R Ferkla region) [cf the low infestation figures found at Tinejdad] Shells of snails can often be found in the mud cleaned out of the waterways and examination of this mud enables the authors to say that *Bulinus* exists at Meski (R Ziz) Goulmina (R Gheris) Tinejdad Igh Mellab Tourong (R Ferkla) Bou Denib (R Guir) and Bou Anane (R Guir region) and that planorbids exist at Ksar-es-Souq and Meski (R Ziz) Mellab and Tourong (R Ferkla) and Bou Denib and Gourama (R Guir) But neither *Bulinus* nor planorbids were found at Rich (upper R Ziz) and Ain Chaur (E of R Guir) *Bulinus* seems to prefer the lower courses of the permanent waterways *Melanopsis* frequenting the upper reaches This doubtless explains why few egg carriers were found among children at Meski (on the upper Ziz) Children prefer to bathe in the upper rather than in the lower reaches The Oued Ziz and the Oued Guir are already known to be foci The authors do not think that the Oueds Gheris and Ferkla have been recently infested The natives say that they know the disease that they have all had it and that it has never killed anyone they think it benign and do not consult doctors (cf Marrill *et al* above) so that it has to be sought out to be discovered Colonial troops especially Senegalese and Egyptian have been accused of bringing in the disease but the authors think that it existed in these areas before the establishment of the Protectorate If it came from the French Sudan it may have been brought by black labour from there or by the extensive exchanges between Ma hreb and the Niger which went on after the Sultans of Morocco conquered towards the end of the 16th century the empire of the Berbers of the French Sudan The authors think that the contamination of the Tafilalet area is long standing and is only a part of a vast endemic area running from SW to NE and including all the palm groves south of the Atlas This area constitutes an ancient cradle of the disease which has played and will play a considerable part in the spread to North Africa Only part has been surveyed The authors study of the Oued Ferkla and Oued Gheris regions fills in the gap between the known foci in the Oued Ziz and Oued Draa regions but further surveys are needed The disease has been noted at Marrakesh It is logical to regard the other foci in Morocco as originating from this southern Atlas area The Portuguese focus at Al arve has also been regarded as being derived from Morocco Moroccans probably contaminated Saint Aimé de la Dridouia (cf Marill *et al* above) where conditions favour the disease but Morocco is not the only source of the infestations Foci are known in Tunisia *e.g.* at Gafsa the shores of the Schott Djerid Kairouan Matmata Tabarca and Cape Bon others are known in the Algerian Sahara In general North Africa seems to have been infested from both East and West Algeria having escaped until recently although we do not know whether all the palm groves of S Algeria are free from the disease because it is easily overlooked Prophylactic measures are briefly discussed Too much must not be expected from them in infested areas except so far as Europeans are concerned Travelling workers spread the disease irrigation works favour it Regarding the suggestion of Marill *et al* that incoming Moroccan workers should be examined before they enter Algeria Barneoud and Gaud think that they should be examined at their native villages rather than at the Algerian frontier After three negative urine examinations done at intervals they could be given sanitary passports and allowed to proceed G Lapa e

CLASTRIER (J) Prophylaxie de la bilharziose Sur la resistance des bulins à la dessiccation [Prophylaxis of Bilharziasis On the Resistance of *Bulinus* to Dessiccation]—*Arch Inst Pasteur d'Algerie* 1941 Mar Vol 19 No 1 pp 64-66

The author records the despatch by BARLOW in May 1940 of 100 dried *Bulinus truncatus* and 40 *Physa subopaca* collected in Egypt on April 23 1940 to SERGENT at the Pasteur Institute Algiers When these were put in water at Algiers 39 days later 17 of the *Bulinus* shells were damaged and the snails were dead but three of the remaining undamaged ones were still alive One of these a small one died the next day one a medium sized one lived about a month one a large one laid eggs a month later and its progeny did well until two months later chlorinated town water was accidentally added to the culture and thus killed them

This observation supports BARLOW's contention that *Bulinus* withstands drying for much longer than used to be thought possible [this *Bulletin* 1933 Vol 30 p 674] BARLOW found that in Egypt this snail withstood winter drying of the canals for as long as 50 days and that some withstood drying for 7 months in the Kordofan Egypt region These observations are interesting in relation to the study of the focus of bilharziasis in the Bas Chéfi plain in Algeria

G Lapee

CULBERTSON (James T) & ROSE (Harry M) Skin Tests in Schistosomiasis with Antigen from *Pneumoneces medioplexus*—*Amer J Hyg* 1942 Nov Vol 36 No 3 pp 311-315 With 3 figs

The diagnosis of schistosomiasis is difficult if there are few or no eggs in the faeces or urine and examination of these is useless if the worms are all males Precipitin complement fixation and intradermal tests have all been used as aids to diagnosis but it is difficult to obtain antigens The antigen generally used is obtained from the livers of snails infected with the cercariae or sporocysts Infected snails are not available in the United States However as FAIRLEY has shown any mammalian schistosome can be used as a source of antigen for diagnosing infections with human schistosomes because common antigens exist Authors are quoted who have used antigens derived from *Fasciola hepatica* of sheep and *F. gigantica* of cattle for the diagnosis of human schistosomiasis Culbertson and Rose used antigen derived from *Pneumoneces medioplexus* a distome in the lung of the leopard frog (*Rana pipiens*) and obtained powerful immediate skin reactions in three infected human patients and none in twelve normal persons tested

The lungs of the freshly killed leopard frogs were teased and the flukes were washed several times in distilled water and dried in air at 37 C The dried flukes were triturated in a mortar and a 1 per cent suspension of this worm powder in 0.5 per cent carbolised salt solution was made This was incubated for 24 hours and centrifuged The slightly opalescent supernatant fluid decanted and tested for sterility was the stock extract used for the tests with or without dilution with carbolized salt solution [The positive results with a carbolized extract are interesting in view of the opinion that false positives obtained with *Trichinella* antigens may be due to the presence of phenol in the extracts used See SPATH below]

For the skin tests 0.1 cc. of the stock extract or of dilutions of it were injected intradermally. Weals with pseudopodia which reached a maximum size in 10 minutes were obtained in three patients known to be infected with *Schistosoma*. The reactions are illustrated. There was local itching. Some patients showed erythema round the weal but controls given the carbolyzed salt solution only also showed this. No extension of the initial bleb and no pseudopodia were seen in 12 persons known not to have been exposed to schistosomiasis. In the positives some reaction followed all degrees of dilution of the antigen up to 1 in 200 but there was none after a dilution of 1 in 300. Heating the stock extracts to 100 C. did not impair the antigen after autoclaving them at 120 C. at 15 lb. pressure there was no reaction in one patient but in two the reactions were about the same as those given by the unheated extract. Suspension of the worm powder in ether alcohol and distilled water showed that there was no reaction with the alcohol-soluble substances obtained with the ether soluble substances one patient was negative two gave only slight reactions with the water soluble substances all gave reactions as good as those given by the original stock extracts. The antigens are thus primarily water soluble. Tests on four patients who had been treated and no longer showed symptoms suggested that skin sensitivity is lost within 3 years but possibly not within 2 years after successful treatment. Tests done with antigens from heterologous species must be interpreted with caution although there is little danger of error when the heterologous species is like *Pneumococcus* not infective to man.

G. Lapeere

DALLAINES (F.) LAVIER (G.) & GANDRILLE. Une petite epidemie de distomatose hepatique a *Fasciola hepatica*. Diagnostiquee retrospectivement. [A Small Epidemic of Hepatic Distomiasis due to *Fasciola hepatica* Diagnosed Retrospectively].—*Presse Med.* 1942 Dec 5 Vol 50 No 52 pp 738-739. With 1 chart.

Human distomiasis is rarely recognized because the symptoms are not characteristic. The authors diagnosed three cases nine years after they had become infected. All were taken ill when they returned from La Baule. The source of infection could not be fixed with certainty after so many years but in other cases it is usually wild or cultivated grass contaminated by sheep [cf. BERGE *et al.* this Bulletin 1942 Vol 39 p 703].

The cercariae encysted on the aquatic plants pass through the wall of the stomach of the patient to the peritoneal cavity and penetrate Glisson's capsule. While this is happening the patient shows signs of hepatitis with eosinophilia but without eggs in the faeces because the parasite is not yet adult. Passing into the biliary canal the parasite becomes adult in these in about three months. During this period the patient shows more or less acute symptoms but these have disappeared when eggs appear in the faeces. The clinical signs are then those of biliary obstruction with a progressive and spontaneous decrease of the eosinophilia.

The three patients all women showed different clinical signs. In 1933 case 1 began soon after the patient's return from La Baule with painful epigastric crises radiating to the right shoulder. Subconjunctivitis of the conjunctivae with dark-coloured urine followed with intervals of

remission of the pain. Her appendix was removed but the pain persisted throughout 1934. Thereafter she had transient spells of headache, urticaria and diarrhoeic crises. In December 1940 new crises arose with gall bladder pain, icterus and fever, pale coloured faeces and mahogany coloured urine. Medical treatment for gall stones with superadded infection was not effective; the patient lost weight and had persistent nausea, persistent pain in the liver region and in the back. In February 1941 there was another acute crisis. Subsequently radiography showed an enlarged gall bladder with calculi; there was slight anaemia, a lymphocytosis of 33 per cent and an eosinophilia of 9 per cent. Operation revealed dilatation and thickening of the hepatic duct which was blocked by two living flukes. Medical treatment for distomiasis was given. Carbon tetrachloride was badly tolerated; emetine had to be stopped after the 15th injection because of slight paresis of the lower limbs. The blood showed now a progressive increase of the erythrocytes and an eosinophilia of 4-7 per cent. The general condition was rapidly improving and pain had disappeared. A further course of emetine caused paresis, hypotension and urticaria. In spite of the patient's excellent general condition and the fall of the eosinophil count to 1.5 per cent, eggs of *F. hepatica* were still being found in the faeces.

In September 1933 patient 2 had painful epigastric crises with headache, insomnia and night sweats, a temperature oscillating up to 39.5°C and an eruption on the thorax and abdomen which was not diagnosed. The liver was enlarged and tender and respiration difficult. The blood showed anaemia with a leucocytosis and an eosinophilia of 19 per cent. No parasites were found in the faeces. Laparotomy revealed numerous small whitish nodules on the surface of the enlarged liver resembling milary abscesses and some perihepatitis. Aspiration of a pleuritic effusion at the right base drew off scanty sterile pale yellow fluid. Polyadenitis suggested removal of an inguinal gland but examination of this excluded Hodgkin's disease. The temperature then fell and the general condition improved. The patient had lost weight but her symptoms abated and she recovered strength. Only the eosinophilia persisted. From 1934 onwards epigastric crises occurred about 5 or 6 times a year but lasted only a few hours. By June 1942 the patient was in excellent general health but still had an eosinophilia of 10 per cent and eggs of *F. hepatica* were found in the faeces. This patient had most parasites of the three; the nodules on the surface of her liver and the perihepatitis are symptoms well known in animals but have been noted in man in only two other cases; her eosinophilia was moderate (4 compared with recorded eosinophilias of 60-75 per cent).

Patient 3 had similar epigastric crises in November 1933 lasting for some weeks. In 1934 she had outbreaks of urticaria, faintness, nausea and pain in the right hypochondrium. Her blood and stool were not examined until March 1942 when eggs of *F. hepatica* and an eosinophilia of 6 per cent were found.

The view that man is a bad host for *F. hepatica* is confirmed by the long duration of infections in him. GUIART notes that in four years BURGÉ reckoned 134 years in one case, but does not say whether reinfection had occurred. In the author's reinfection was not probable.

PODOLSKAYA (A. P.) On the Diagnosis of Taeniasis under Conditions of Mass Work.—*Med. Parasit. & Paras. Ds* Moscow 1942. Vol. II No 3 pp 94-99 [In Russian.]

Since the usual coprological methods are inadequate for the detection of taeniasis in mass surveys an attempt has been made to find a method of diagnosis yielding the highest percentage of positive results from a simple examination. This work was carried out in 1939-40 in Azerbaïdjan (Caucasus). A comparison was made of the following methods: (1) examination of faeces (Fulleborn's method and smear) (2) scrapings of the perianal region and (3) questioning of the population. In the case of infections with the beef tapeworm the best results were obtained with the last two methods. Among 638 known infected persons scrapings were positive in 96.4 per cent while interrogation indicated the presence of proglottides in the stools of 84 per cent. Similar investigations on the diagnosis of pork tapeworm infection showed that these methods were less effective. However in view of the paucity of material the results obtained with this cestode are inconclusive. The author recommends the introduction of combined interrogation and perianal scrapings as the chief methods for the detection of beef taeniasis in medical establishments, while questioning of the population is regarded as sufficient for mass surveys provided the infection in persons reporting positive findings is checked by the examination of perianal scrapings.

PODOLSKAYA (A. P.) & KAMALOVA (A. G.) Cutaneous test as a Method of Diagnosis of Taeniasis and Cysticercosis.—*Med. Parasit. & Paras. Ds* Moscow 1942. Vol. II No 3 pp 99-105 [In Russian.]

The authors tested the diagnostic value of an allergic skin reaction for taeniasis. The antigens were prepared from the cysticerci of cattle and pig and were used as follows: (1) bovine—in cases of cattle taeniasis in human being (112 infected and 48 control) and in cysticercosis of cattle (14 infected and 37 controls) (2) porcine—in human cysticercosis (4 infected). The nitrogen content of the antigen used for tests in human beef taeniasis was 0.00008 gm. per 0.2 cc. and in that used in human and animal cysticercosis 0.00008 gm. per 0.2 cc. (0.2 cc.) The cutaneous test reacted positively in 74.1 per cent. of human cases when the beef tapeworm was present and in 56.2 per cent. in its absence as well as in 25.6 per cent. of cases of bovine cysticercosis and in 17.6 per cent. of uninfected animals. The bovine antigen thus proved to be non-specific in cutaneous tests and unsuitable for diagnostic purposes.

PIROSKY (Ig.) PIROSKY (R. de) & CASIRAGHI (J. C.) Hipersensibilidad de infección en la hidatidosis del hombre. [Hypersensitivity in Human Hydatid Disease.—*Rev. Ins. Bacteriol.* Buenos Aires 1942. Sept. Vol. II No 1 pp 94-98. With 2 coloured plates.]

Earlier workers have used in various ways the liquid from hydatid cysts of man, oxen or sheep or extracts of the cyst membranes or scoleces to produce intradermal reactions for the diagnosis of hydatid infections. The authors studied (A) The nature of the antigens.

The reaction can be produced either by a protein or by a polysaccharide both of which they isolated from the hydatid fluid the cyst membranes or the scoleces. They obtained the protein by precipitation with saturated NaCl at pH 3.2 and redissolved it in normal saline at pH 7.8 the process being repeated several times before the final solution was used. The polysaccharide was obtained by treatment of the material with alcohol at pH 5 in the presence of sodium acetate (5 per cent). The optimal dose of the protein produces in an infected and sensitive patient a local reaction which has the three classical features—a central pale red papule which extends within 4–40 minutes and emits pseudopodia which distinguish it from pseudo-reactions a zone of erythema round this which begins in 10 minutes and increases to its maximum in 40 minutes after 5 hours there is intense and homogeneous erythema 6–10 cm in diameter with the third characteristic oedema now 3–4 cm thick. The polysaccharide produces a reaction with the same for 4–5 days. The oedema is predominant this reaction also begins early and lasts only 3–5 hours and is much less intense. Thus both reactions begin early but the reaction to the polysaccharide is only transient.

(B) The optimal dose of the antigen. To obtain a maximal intensity of the reactions and to avoid non specific reactions the authors used the highest concentration of each antigen which did not cause a reaction in non infected patients. The doses of the protein and polysaccharide antigens are discussed and good coloured illustrations of the reactions obtained with them are given. Details are included to show that with the protein antigen the intensity and duration of the reaction varies with the concentration of the antigen and with the sensitivity of the patient. With the polysaccharide antigen the reaction does not last long but its intensity also varies with the concentration of the antigen.

(C) The immunological mechanism involved. To test this the P.K. (Prausnitz Kustner) reaction was used. Into the upper middle and lower thirds of one forearm of a non infected patient 0.1 cc of serum from an infected patient was injected and into similar sites on the other forearm 0.1 cc of normal serum. After 24 hours protein antigen was injected into the sites already injected in the upper thirds of the forearms polysaccharide antigen into the sites on the middle thirds and normal saline into the sites on the lower thirds. Each normal individual was used once only. Nine sera were thus investigated. In 7 of them the reaction was positive to the protein antigen only. One was positive to both antigens. The other was negative to both. The authors conclude that in spite of the few cases studied the reaction can be regarded as a true antibody antigen reaction.

G Lapage

MEESER (C. C. V.) Preliminary Notes on Simuliidae (Diptera) of Southern Rhodesia.—*Proc Rhod Sci Assoc* 1942 Vol 39 pp 28–38 With 3 plates [Summary taken from *Res Applied Entom Ser B* 1943 Feb Vol 31 Pt 2 pp 39–40]

This paper consists of a list of 16 species of *Simulium* recorded from Southern Rhodesia (all except one having been taken there in 1940 or 1941) with data on their distribution within the colony and

[June 1943]

their breeding places. Brief notes are also given on the life history of *Simulium* in general methods of collecting rearing and preserving them their relation to *Onchocerca volvulus* (which occurs but has not been studied in Southern Rhodesia) and their seasonal prevalence. Larvae were first found in considerable numbers at the end of the rains and from this time onwards formed big black masses on rocks etc pupae became numerous at the end of April and were most abundant between May and August. In December 1941 females of *S. elgonensis* Gibbins were observed to enter the water to a depth of an inch and deposit eggs on a submerged rock, returning several times to add more eggs to the mass already laid. The process lasted 15-20 mins. Large numbers of *S. bovis* De Meillon were found by A. Cuthbertson attacking both Europeans and Africans. adults of the other species were not observed to feed.

MAZZOTTI (Luis) Comprobacion de la existencia de *Microfilaria* *o. ardi* en Mexico [Verification of the Existence of *Microfilaria o. ardi* in Mexico]—*Rev. Inst. Salubridad y Enfermedades Trop.* Mexico 1942 Sept Vol 3 No 3 pp 223-228 With 4 figs on 1 plate English summary (8 lines)

Microfilaria of Mansonella o. ardi have already been found in Panama Colombia Dutch Guiana Argentina and the islands of Santa Lucia and Dominica. In Mexico HOFFMANN recognized them in natives from the Quintana Roo region. The author found endemic foci of this filariasis in the northern part of the State of Campeche and in the frontier regions of the Peninsula of Yucatan in two of which the percentage of parasitized individuals exceeded 50. He gives the measurements of the *microfilaria* by which he identified it. Surveying its incidence in the Yucatan Peninsula he found that 300 workers from the Quintana Roo region were all negative but in the western watershed of the Peninsula the following percentages of infected persons were noted: Santa Cruz Campeche 53 per cent of 109 examined Santa Maria Campeche 78 per cent of 28 Tancunche Campeche 25 per cent of 32 Hecelchakan Campeche 11 per cent of 73 and Chunchucmil Yucatan 1 per cent of 100. In relation to the population the figures for Santa Maria and Santa Cruz are higher than those given by McCoy for Darien Panama (44.5 per cent of 119 examined).

Out of 618 persons examined in the western watershed 98 were infected 59 being men and 39 women. No infections were found in children under 3 years. The infected persons were found in an area devoted to the cultivation of agave which had a climate topography and vegetation more like that of central Yucatan than the wooded regions of Quintana Roo from which Hoffmann's two cases came. This watershed is less than 10 metres above sea level. It is a limestone area covered with a thin layer of red soil and humus with depressions filled with water which is either permanent or only there in the wet season. *Culis* and *sur* is mentioned as a possible vector of *M. o. ardi*. In Santa Cruz it is active all the year round but becomes a pest in the wet season. Females are easily collected in the open in the shade during the early morning or at sunset but they attack man most at night inside houses.

G. Lafay

BARON (Bessie) & BRUNNER (Matthew) Active Sensitization in
Human Belngs with Trichina Antigen—*Jl Allergy* 1941-42
July Vol 13 No 5 pp 459-466

Brunner has already been able to sensitize a large percentage of human beings to *Ascaris* antigen by repeated subcutaneous injection of *Ascaris* extract and to transfer the positive skin reactions to normal people by the Prausnitz Kustner technique. This paper records a study of the sensitization of patients with *Trichinella* antigen and of group relations between *Trichinella* and *Ascaris*.

Three different antigens were used all derived from larvae digested out of the muscle of infected rabbits. Antigens 4 and 5 were used undiluted and unstandardized antigen 9 contained 230 mgm of nitrogen per millilitre and it was used at a dilution of 0.1 mgm of nitrogen per millilitre. All the antigens were extracted in saline and were free from preservatives. Atopic patients were used earlier experiments with *Ascaris* having shown that their atopic nature did not increase their tendency to sensitization. The first intracutaneous test was done with 0.1 ml of antigen 9 and only patients giving negative reactions were used. Injections of 0.1 ml were given to these at intervals of 1-2 weeks over a period of 4-20 weeks. Skin reactions being read within 15 minutes after testing. When hypersensitiveness developed a positive skin reaction resulted from the intracutaneous test consisting of erythema and itching within 5 minutes followed by a weal.

In series 1 six patients aged 12-23 years were given antigen 4. Sensitizing injections of 0.1 ml of undiluted antigen were given for 4-10 weeks. Cases 1 and 2 gave positive reactions with weals with the 3rd sensitizing dose. Case 3 gave it with the 5th. Cases 4, 5 and 6 were doubtful after 6 injections.

In series 2 six children aged 4-12 years were given antigen 5. Sensitizing injections of 0.1 ml were given for 6-9 weeks. Case 8 was positive with the 6th sensitizing dose. Case 10 with the 7th. Case 7 with the 9th. Cases 9 and 12 were doubtful with the 4th one continuing doubtful the other becoming negative. Case 11 remained negative after the 8th dose.

In series 3 six patients aged 14-44 years were given antigen 9. Sensitizing doses of 0.1 ml were given for 12-20 weeks. Case 18 was positive with the 4th dose. Cases 13 and 15 with the 5th. Case 14 with the 8th. Further tests confirmed all these. Case 17 was doubtful to the 9th and 11th doses. Case 16 had given no reaction by the 11th dose. Cases 12 and 17 were considered negative because they never gave one plus weals (weakly positive) and weals did not reappear with subsequent sensitivity doses. Of these 18 cases 10 (56 per cent) showed induced sensitivity indicated by a weal and erythema. When patients showed definite cutaneous sensitivity blood was taken from them and centrifuged and kept in a refrigerator without preservative. Normal nonatopic persons who gave negative intracutaneous tests were given 0.05 ml of undiluted serum at several sites on each arm. They were then tested intracutaneously 3-7 days after sensitization. Controls being done on the skin adjacent to each sensitized site. *Ascaris* antigen was used for testing at a dilution of 0.1 mgm of nitrogen per millilitre and *Trichinella* antigen undiluted or at dilutions of 1 or 0.1 mgm of nitrogen per ml. The reactions were read about 20 minutes after testing. Sera were also used from patients sensitive to *Ascaris* antigen.

as a result of being infected with *Ascaris*. Out of 57 transfer tests on *Trichinella* sera with *Trichinella* antigen 13 were negative 35 were weakly positive 7 were definitely positive and 2 were strongly positive. Of the 17 transfer tests done with these same sera with *Ascaris* antigen 7 were negative 7 were weakly positive 1 was definitely positive and 2 were strongly positive.

Out of 17 passive transfer tests done with *Ascaris* antigen on 9 *Ascaris* sera 1 was negative 3 were weakly positive 2 were definitely positive 8 were strongly positive and 3 were markedly positive. Out of 10 passive transfer tests done on these same sera with *Trichinella* antigen 8 were negative 1 was weakly positive and 1 was definitely positive.

These results indicate that *Ascaris* and *Trichinella* extracts contain a common antigen and that the homologous antigen gives stronger reactions than the heterologous one.

The authors conclude that skin test doses of *Trichinella* antigen may sensitize the skins of normal individuals that definite marked hypersensitization developed in 6 out of 18 patients after 3-5 sensitizing injections while in 10 out of 18 patients there was definite evidence of sensitivity by the 9th dose that the cutaneous reaction in sensitivity to *Trichinella spiralis* is mediated by the atopic reagin and can be transferred to normal skins that *Ascaris* and *Trichinella* antigens contain a common antigen which is probably stronger in the *Ascaris* than in the *Trichinella* extract even though the *Trichinella* antigen transfers better on *Trichinella* sera and that the diagnostic value of *Trichinella* tests diminishes with repeated intracutaneous injections

G Lapeere

SPAETH (Harold) Die Diagnose der Trichinose mittels Hauttest und Komplementbindungsreaktion [The Diagnosis of Trichiniasis by means of the Skin Test and the Complement Fixation Reaction]—*Deut Med Woch* 1942 Sept 18 Vol 68 No 38 pp 935-938

The simple method of the skin test which can be done at the bedside is a valuable aid in the diagnosis of doubtful or symptomless cases of trichiniasis it is more sensitive than the eosinophilia which may be low or absent it is useful for the detection of infections among people in areas where the infection is known to have occurred. The complement fixation reaction is not so reliable and is troublesome requiring a trained staff. This conflicts with GAASE's results (*Munch Med Woch* 1941 No 16) Gaase using antigen made by the same makers (I G Farben Werk Höchst) found the complement fixation reaction to be specific and valuable for diagnosis. [It would appear that much of the confusion of opinion about the respective value of these two tests arises from the use of antigens prepared by different methods from the reading of the reactions at different times during the progress of the disease and from the use of different dilutions of the antigen.] Spaeth emphasizes the need for a sound antigen one consignment sent to him was spoiled he thinks that a dried powder is the best the antigen in ampoules dissolved in 0.5 per cent phenol gave after being kept for 6 months many non specific reactions. [Probably the phenol was responsible for this. Bozicevich's (this *Bulletin* 1939 Vol 36 p 847) antigen made with saline only kept for 6 months in the sunlight.]

Spaeth describes the technique of the skin reaction. An antigen dilution of 1:500 was used and 145 persons were tested. The immediate reaction appears within 10-30 minutes and consists of a red weal of varying extent which may develop pseudopodia and usually has an erythematous area around it of variable size. The weal is occasionally white or varies from white to pink. The delayed reaction when it is typical shows the cockade form shown by the tuberculin reaction: i.e. a dark red raised centre often bordered by a flat white weal 1-5 mm broad around this again there may be a broad red erythematous area. This late reaction may be visible after 48 hours to 3 days.

Briefly the reactions given by the 4 groups of patients are as follows. Group 1 consisted of 38 men aged 30-45 all already diagnosed. In the 7th week (11 weeks after the eating of infected meat) an immediate reaction occurred in 35 of them, 3 were negative but 2 of these were positive with an antigen dilution of 1:250. The third was not tested again. In the 13th week 30 of these 38 were tested again. Both immediate and late reactions then occurred in 15. The immediate reaction alone occurred in 9. The delayed reaction alone in 5 while one showed neither reaction.

Group 2 consisted of 21 men aged 19-30. In the first week (4 weeks after the eating of infected meat) 6 showed no immediate reaction (within 30 minutes) in 5 the reactions were slight while in 10 they were well marked. After 3-6 hours the delayed reaction was marked in all. In the 4th week 12 were tested again and all showed an immediate reaction and also a delayed reaction 6 hours later. After 24 hours this had disappeared from 3. In the 6th week 19 were again tested. In 7 the immediate reaction was then well marked in 2 it was feeble in 10 it had been lost (negative). The delayed reaction (at the 14th hour) was positive in 15 negative in 4. In the 6th week some negatives occurred but only in cases which had earlier been feebly positive. In the 13th week 21 were again tested. The immediate reaction was well marked in 14 feeble in 4 and negative in 3. All of these negatives having been feebly positive or negative in the earlier tests. It was possible to note the delayed reaction after 24 hours in only 10 of these patients. It was positive in 5 feeble in 4 and negative in 1. Almost all of the 20 men of group 3 after the 5th week gave negative delayed reactions and the reliability of the antigen used was doubted.

The tests done on the 62 men of group 4 who were contacts from the area from which the men of group 1 were drawn indicated the value of the test for the diagnosis of suspected but undiagnosed cases. At a time corresponding to the 3rd to the 5th week of the disease in the men of group 1 17 of group 4 gave a positive skin reaction and had an eosinophilia of 10-42 per cent. In 33 of them who had no eosinophilia or symptoms the test was negative and these were regarded as free from the disease. Of the remaining 12 one had no eosinophilia and his positive skin test was regarded as doubtful because he had asthma. The test was negative in 3 who had light eosinophilia of 6-10 per cent but no symptoms. These also were regarded as free from the disease. The test was positive in 6 others none of whom showed symptoms. Eosinophilia being absent or doubtful these 6 were regarded as being cases of latent trichinosis (*Trichinosis insensibilis* of Wiegand). The remaining 2 of group 4 had eaten uncooked infected meat but they had a negative skin test without eosinophilia or symptoms and were regarded as having escaped infection. The skin test thus diagnosed

certain symptomless cases in men who had eaten infected meat some of which had been cooked. It was also more reliable than the eosinophilia.

For controls on healthy men only a small amount of antigen was available. All the 24 men tested were negative except one who came from an infected area. Infection with other nematodes (*Ascaris*, *Trichuris*, *Enterobius*) are important. The author taking his facts from a paper by SCHIPULL does not fully represent the results of MCCOY, MILLER and FRIEDLANDER who found that group reactions due to infections with *Trichuris* may occur with an antigen dilution of 1:500 although they are less likely with a dilution of 1:10,000. They did not think that infections with nematodes other than *Trichuris* were an appreciable factor in causing group reactions to the 1:10,000 dilution. They thought that a negative skin test is more valuable than a positive but still considered the test to be a valuable aid in diagnosis. [Their antigen was preserved in phenol (0.4 per cent).] BOZICEVICH obtained no false positives in the presence of *Ascaris*, *Trichuris*, hookworms, *Enterobius* and *Hymenolepis nana* using his antigen made with saline only i.e. without preservatives but BARROW & BRUNNER find that *Ascaris* and *Trichinella* extracts contain a common antigen. SPAETH criticizes KILBUEFFER's results on the ground that his antigen dilution was too strong and that he read his reactions too late (at 24 and 28 hours). SPAETH insists that the time of the investigation after the beginning of the disease must be considered.

Thus the skin test is a valuable diagnostic aid. In all clinically certain cases up to the 7th week both immediate and delayed reactions were positive. After the 7th week in 5 out of 59 patients both reactions were negative but the antigen was uncertain and 2 of them tested again in the 13th week were positive. After the 6th week the test in general decreases till it is feeble in light infections. In the early weeks both immediate and late reactions are usually equally strongly positive after the 6th week only one of them may be positive. In the first week of the actual disease the delayed reaction alone may be positive the immediate negative. This indicates that the antibody has to be carried to the skin from some other source. The latest test done by SPAETH was at 6 months and it was then still positive.

G. Lapeere

DEFICIENCY DISEASES

MOORE (D. Fitzgerald). Food and Vitamin B Deficiencies.—*Jl Trop Med & Hyg* 1942 Sept 1 Vol 45 No 17 pp 179-181 [12 refs.]

The author recalls his original observations (published in 1934 and subsequent years and summarized in this *Bulletin*) upon the interesting syndrome occurring in native school children in Southern Nigeria.

characterized by angular stomatitis sore tongue dry scaly itching scrotum associated with dimness of vision etc a syndrome subsequently shown to be improved by administration of riboflavin and cured by marmite but unaffected by nicotinic acid This syndrome was constantly associated with the consumption of a preparation of manihot called *gari* as the staple food At the author's request Miss CHICK tested samples of manihot and *gari* obtained by him from West Africa and showed them to have a practically negligible riboflavin content While reserving his opinion concerning any positive ill effect from the manihot and its preparations and also concerning the question whether any other vitamin than riboflavin is involved he believes that dead foods as he calls them such as *gari* in Nigeria and rice sago arrowroot in other parts of the world are a grave nutritional danger when eaten to the exclusion of what he calls protective foodstuffs

In conclusion he says It is necessary to keep careful observation on the increased use of such foods in the tropics under conditions where the rest of the diet may be lacking in sufficient protective foods [A very pertinent observation when now more than ever perhaps by force of circumstances or mere fashion native races change their staple foods]

H S Stannus

DEKLEINE (William) Control of Pellagra — *Southern Med J* 1942 Nov Vol 35 No 11 pp 992-996 With 1 graph [11 refs]
[Summary appears also in *Bulletin of Hygiene*]

The highest death rate from pellagra in the United States was recorded in 1928 It was 22.4 per 100 000 for the thirteen Southern States in which pellagra has been a major health problem for many years This was the peak year of a rapidly increasing mortality rate and from then on it progressively decreased to reach a rate of 0.1 per 100 000 in 1940 The factors responsible for this improvement are discussed It is significant that the greatest improvement occurred in the 1929-1932 period a time of severe depression and it was due to work of the American Red Cross in distributing yeast extensively and in promoting gardening The Federal Food Relief programme (started in 1933) did not affect the pellagra death rate though it no doubt prevented other serious forms of malnutrition Actually the downward trend continued at a much slower rate from 1933 to 1936 coinciding with a sharp reduction in the amount of yeast distributed and a diminution in the gardening propaganda The free distribution of food (as under the New Deal) does not necessarily alter the dietary habits for those on relief are able to select largely what they want and not necessarily what they need Had it not been for the interest of pellagrins themselves who begged for yeast when they became ill the death rate would probably have risen again during the 1933-36 period

Niacin (nicotinic acid) is undoubtedly the best therapeutic agent but unless treatment is followed by a diet which contains other parts of the vitamin B complex disturbing symptom not directly related to the disease may arise It cannot be distributed on a mass basis as its use demands personal medical control and it seems that brewer's yeast will continue to play an important part in the control of the disease Advanced cases are now much less common but milder cases are numerous and the disease will not be eradicated completely until an adequate diet is obtainable by all in the affected areas

H A Green

MILLAN GUTIERREZ (Jorge) SALAZAR MALLEN (Mario) & MARTINEZ BAEZ (Manuel) Existencia en Mexico de la melanosis de Riehl [Melanosis of Riehl in Mexico]—*Rev Inst Salubridad y Enfermedades Trop Mexico* 1942 Dec Vol 3 No 4 pp 333-346 With 12 figs on 2 plates [12 refs]

For two years past the authors have been observing and studying cases of dyschromic dermatosis to which they had called attention previously as occurring particularly in women of the poorest class. The condition is characterized by dark pigmentation of exposed parts—face neck arms and hands. The diagnosis of Addison's disease or of pinta has often been made and treatment by suprarenal extract or arsenic given without benefit.

The authors now class it in group 3 of Gougerot's pigmentary lichenoid conditions i.e. Invisible pigmentary lichen without pruritus. Of 15 cases here referred to ten were bakers two were cooks two engaged on laundry work and one a hawker in other words most were exposed to unusual heat and the parts most exposed were those most affected. The lesions may be quite small punctate and numerous or the areas involved may be large with ill-defined edges. Biopsy reveals the histology of subacute to chronic inflammation with melanophore cells. One of the authors has produced the condition experimentally by exposure to heat from a stove or to infra red rays.

As stated the subjects were of the poorest class their diet was inadequate with little meat and much maize. Without going so far as to state that these are cases of pellagra they say that the diet is deficient in vitamins especially the B complex and C. Change of occupation and improvement in diet are followed by restoration to normal.

H. Harold Scott

SPRUE

VEDDER (Edward B) The Components of the B Complex in the Cohn Liver Extract in Relation to Sprue—*Am J Trop Med* 1942 Nov Vol 2 No 6 pp 609-612

In addition to the erythrocyte maturing factor (E.M.F.) the Cohn fraction which in various stages forms the basis of all commercial liver extracts also contains a factor which restores the ability of the intestine to absorb fats—an ability which is lost in sprue and the loss of which is responsible for most of its symptoms.

In order to obtain evidence concerning this latter factor certain experiments were performed on a diet adequate except for thiamin and the B complex but with the addition of the Cohn fraction of liver extract and subsequent addition of synthetic vitamins of the B complex as they were required to ensure growth. Details are given of the preparation of the Cohn fraction from one kilo of beef liver. In preliminary experiments it was found that rats fed on this diet in addition to the Cohn fraction of liver all developed polyneuritis which was relieved by the administration of thiamin chloride. From this it became apparent that the Cohn fraction contains no thiamin. These rats required pyridoxine (B₆) and pantothenic acid and there was little gain in weight until riboflavin was added.

As the result of the experiment it could be reasonably inferred that since the Cohn fraction of liver is deficient in thiamin pyridoxine pantothenic acid riboflavin and choline none of these factors is responsible for the relief of the intestinal symptoms of sprue. Nicotinic acid was not added as liver extracts are known to contain this vitamin in relatively large quantities (up to 450 mgm per cent). From this experiment it could not be stated that the action of liver extract on the intestine is due solely to its contained nicotinic acid but it is highly probable that this is so. The author considers that the erythrocyte maturing factor (E M F) of the Cohn fraction of liver relieves the macrocytic anaemia of sprue but has no effect in controlling intestinal symptoms and that the substance in liver that controls intestinal absorption is nicotinic acid.

P Manson Bahr

AUFMAN (William H) & SMITH (Dudley C) Cutaneous Changes in the Sprue Syndrome—*Jl Amer Med Assoc* 1943 Jan 16 Vol 121 No 3 pp 168-171 With 3 figs [21 refs]

In sprue glossitis stomatitis and fissuring at the angles of the mouth (ariboflavinosis) respond favourably to liver extract and appear to be related to deficiency of the vitamin B complex.

The role of avitaminosis in the production of pigmentation of the skin required investigation. There can be no doubt that a deficiency of the fat soluble vitamins exists in patients with steatorrhoea. Certain components of the skin changes in sprue such as roughness and dryness of the skin with follicular keratosis may be due to avitaminosis A. It may be that the low values for serum calcium and phosphorus may be due to failure of absorption of vitamin D.

Since the icteric index is rarely elevated excessive haemolysis appears to play little part in the production of pigment. The skin pigment does not give the iron reaction. The histopathological features of the case described show an increase in the melanin content of the basal cell and rete layers and support the theory that this pigmentation is an increase of the normal skin pigment.

Differential diagnosis of the cutaneous pigmentation of sprue offers no great difficulty.

The pigmentation of Addison's disease may be indistinguishable clinically and histopathologically from that of sprue but pigmentation of the mucous membranes of the mouth in this disease may be of differential value and the tendency to excretion of urine with high chloride concentration is of diagnostic significance.

VAUX (Dorothy M) Chyladenectasis with Steatorrhoea—*Jl Path & Bact* 1943 Jan Vol 50 No 1 pp 93-96 With 3 figs on 1 plate

Obstruction of the lacteals has been held responsible for the sprue syndrome. It is claimed that the record of the case here described bears this out. The subject a man of 49 had suffered from indigestion for 9 years. He had had cholecystectomy and finally partial gastrectomy with gastro-enterostomy done the last on the supposition that the condition of the stomach was malignant. From this last operation he did not recover but six weeks prior to death he suffered from diarrhoea with steatorrhoea of moderate degree (39.1 per cent of dried faeces) with positive occult blood.

At autopsy interest centred round the mesenteric glands which were swollen rubbery discrete and formed a large mass. The cut surface appeared finely cystic and oily droplets exuded on slight pressure. The lacteals of the jejunum and upper ileum were conspicuous and slightly dilated. In microscopic sections of the affected lymph glands the same appearances were observed. The most striking feature was the dilatation of the lymph sinuses producing cystic spaces ranging up to 5 mm in diameter. Foamy macrophages formed an outer surrounding layer in many of the dilated sinuses.

It is considered that the main features correspond to the case described by HURST WRIGHT and RYLE (1942) of chronic mesenteric tuberculosis of 17 years duration with sprue symptoms as well as the four described by FAIRLEY & MACRAE (1937).

The only similar case to the present one in England was described by GLYNN and ROSENHEIM in 1938.

[It is by no means clear from the published protocol whether this case could be said to have exhibited typical sprue symptoms. There is no mention of glossitis, hypocalcaemia or macrocytic anaemia whilst steatorrhoea was of moderate degree only.]

F. Manson Bahr

HAEMATOLOGY

TROWELL (H. C.) The Case for the Recognition of Dimorphic Anaemia as a Common Deficiency Anaemia—*East African Med J* 1942. Dec. Vol 19 No 9 pp 268-274.

Detailed analysis of some 450 cases of anaemia in Africans at Mulago Hospital Kampala revealed that at least half represented a mixed nutritional macrocytic anaemia and an iron deficiency anaemia co-existing in the one and the same individual. For this anaemia of dual causation the name dimorphic anaemia is suggested. Stained films show hypochromic cells in the middle of the smear while in the tail and edges the cells are macrocytic many are oval and there is much anisocytosis. The colour index tends to be low or high as the deficiency of iron or of the nutritional macrocytic factor respectively predominates but determinations of the mean corpuscular haemoglobin concentration show many of the macrocytic types to be hypochromic and the colour index is often balanced about unity. Patients with perhaps only a few malaria parasites or a few hookworm ova but with a severe anaemia whose colour index was one were perplexing until the conception of dimorphic anaemia was established. Treated for the intercurrent infections such patients showed little improvement. Following the administration of iron however there was a reticulocytosis and a rapid but incomplete improvement the colour index became greater than one there was increased macrocytosis and the hypochromia was changed to orthochromia. Adequate doses of liver then produced a second reticulocytosis and further improvement. The majority of anaemias in the natives were of this type and required therefore both iron and extrinsic factor. Liver which is now condemned because of infection with fluke but which could never cause infection in man even if eaten raw might well be used as a cheap source of extrinsic

factor. Finally it appears that malaria and hookworm infections are well tolerated by most natives and seldom cause much anaemia provided the diet is adequate [See also this *Bulletin* 1943 Vol 40 p 329] (F Margatroyd)

VENOMS AND ANTIVENENES

- SERGEANT (Etienne) Sérothérapie antiscorpionique. Troisième note
Nouvelles observations (1939) [Treatment by Scorpion Anti-
venene]—*Arch Inst Pasteur d'Algérie* 1940 June Vol 18
No 2 pp 248-274
Sérothérapie antiscorpionique (quatrième note) Observations
de l'année 1940—*Ibid* 1941 June Vol 19 No 2 pp
290-303
Sérothérapie antiscorpionique (cinquième note) Observations
reques pendant l'année 1941—*Ibid* 1942 June Vol 20 No 2
pp 117-121

In these three papers the author continues the series of observations on the value of the serum treatment of scorpion sting accounts of which were given in this *Bulletin* 1939 Vol 36 p 864 1940 Vol 37 p 519 Between 1936 and 1941 the number of cases treated was 873 of which 218 were grave and presented symptoms similar to those noted in fatal cases. Serum was normally injected subcutaneously in doses from 10 to 60 cc (usually 20 cc) and in 184 so treated there occurred 22 deaths. In a few cases serum was given intramuscularly intravenously or intrathecally or by combined routes and in the 34 thus treated there were 10 deaths but these cases were more severe. The recovery rate of the whole was 80.3 per cent and in view of the fact that all these patients were gravely ill the author attributes the high survival rate to the effect of the serum. In 70 cases recovery took place after administration of serum when the patients were apparently moribund. In 11 fatal cases the serum was given too late in nine the amount given was probably too small (10 or even 5 cc) C W

- SERGEANT (Etienne) Quelques observations épidémiologiques et cliniques sur les piqures de scorpions [Epidemiological and Clinical Observations on Scorpion Sting]—*Arch Inst Pasteur d'Algérie* 1942 June Vol 20 No 2 pp 130-134 With 1 fig & 1 graph

Statistics of 1869 cases are presented. The fatality rate was 9.4 per cent in children 15 per cent in adults and 4.1 per cent in aged persons. The seasonal incidence of stings commences in April reaches a peak in August and is practically over by October. Serious cases occur mostly in August. The hands and feet were principally affected the arms and legs next. Of the 183 scorpions identified 142 were *Pronotus anstralis* 26 *Buthus occitanus* and 10 *P. amoreuxi*. In serious cases the interval between the sting and the onset of alarming symptoms was four hours or less in most cases in fatal cases death may take place almost at once or may be deferred up to 30 hours C W

SEPERANT (Etienne) L'envennement scorpionique provoque t il une elevation ou un abaissement de la temperature? [The Body Temperature after Scorpion Sting]—*Arch Inst Pasteur d'Algerie* 1942 Sept Vol. 20 No 3 pp 209-212 With 1 fig [Ref. in footnotes]

In 93 cases in which a note of temperature was made there was pyrexia in more than one-half normal temperature in one-fifth and subnormal temperature in one-quarter. It is however possible that in those cases in which pyrexia occurred the cause was rather an activation of malaria than the simple action of the venom. Injection of venom into animals generally leads to lowering of temperature. In man if subnormal temperature or pyrexia is prolonged after the sting the prognosis is usually grave. C 11

SERPERANT (Etienne) Recherches u la glycemie chez les cobayes a n mes pa le \ n de scorpions [Glycaemia in Guinea-pigs after Scorpion Poisoning]—*Arch Inst Pasteur d'Algerie* 1940 Jan Vol 18 No 2 pp 239-247 With 3 graphs

MOHAMED (Ahmed Hassan) Preparation of Scorpion Toxin—*Lancet* 1943 Mar 13 p 337

MUÑOZ RIVAS (Guillermo) Algunos datos sobre la araña Coya en el Tolima. [Concerning the Spider Coya in the Department of Tolima.—*Rev Facul de Med Bogota* 1942 Oct Vol 11 No 4 pp 208-210]

Tolima is a Department of Colombia and lies to the west of Bogotá. In the district stories of the danger of the bite of *Latrodectus curacaoensis* locally the Coya spider are general and the author undertook some experimental work to test the truth of these reports. *L. curacaoensis* is a small spider [the dimensions are not stated] appearing of a uniform red colour at first sight owing to two large red areas one on the dorsal and one on the ventral surface separated by a black ray along the edge of the body. The young show small dark spots on the dorsum symmetrically distributed. They are not greedy insects and will often seize and envelope their prey and leave it for several days before devouring it. They are commonest in the central and northern parts of Tolima where the temperature ranges from 21 to 24 C. They lurk under stones.

Symptoms commonly reported as caused by their bite are intense local pain, headaches, cramps which may persist for several days, tremor and in some cases tetany.

The author prepared emulsions of the cephalothorax and injected them subcutaneously and intracutaneously into guinea-pigs without result. He then repeated the test using emulsions of the whole spider again without result. He then heard that toxic symptoms were produced only if the body of the spider were energetically rubbed against the skin [a most unlikely thing to happen under natural conditions]. He therefore rubbed specimens of the female spider thoroughly on the depilated skin of guinea-pigs. One showed transient distress and panting respiration and the following day slight paralysis of the hind limbs. None of the others presented any symptoms nor could the author observe any similar disturbance on subsequent experimentation.

He thinks that the symptoms reported by the people are therefore not caused by the toxin of the spider and that the bite produces no more than a local pain and oedema and in some cases an erythematous spot with a sensation of burning

H Haro & Scott

DERMATOLOGY AND FUNGUS DISEASES

BOLETTI DI L. OTICINA SA ITALIA PA AMERICA A. 1942. Sept. Vol 21 No 9 pp 910-922 With 5 charts & 6 plates (Ref. in footnotes) —The Wild Fire (Pemphigus Foliaceus) of Brazil.

The problem of this disease is of sufficient importance for the State of São Paulo to have established a special service and hospital for its study. There is no doubt that it is contagious and by June 1941 500 cases had been registered during three years. Of these 15-20 per cent had proved fatal. The clinical features of the disease are said to be exactly like those of pemphigus foliaceus seen in other parts of the world but the subjective symptoms of itching burning and acute pain are much more severe and have given rise to the popular name for the condition. The characteristic elementary lesion is a serous or purulent bulla. Nikolsky's sign a condition in which the outer layer of the skin peels off by slight injury is always positive as the disease spreads over the body, a spread accompanied by evening rise of temperature. Once initiated the affection settles into one of four types acute subacute (most common) superacute (with rapid fatal closure) or chronic. In this last form the picture may be dominantly bullous or foliaceous pustular hyperpigmented papillomatous erythrodermic or herpeticiform. In this chronic form there also occur ankylosis of the joint osteoporosis and disturbance of calcium metabolism. The nails become dystrophic either white or as though stained with iodine (Vieria's sign) but they are rapidly replaced. Alopecia palmar and plantar keratosis lymphangitis of the ears with later local elephantiasis and muscular atrophy are also sometimes seen. Severe endocrine disturbances develop sometimes almost amounting to a change in sex. The ages between 15 and 19 and from 25 to 29 seem to be most susceptible. Of the total cases 66 per cent. are females. No race is immune although the disease is most common in rural areas where sanitary conditions are poor. L. DE BEPPE after much experimental work postulated the existence of a virus and he has transmitted the disease to rabbits by the injection into the testicle of serum from the blood of pemphigus cases. The virus was carried through several passages in animals and then finally transmitted to guinea pigs. Confirmation of these findings is awaited. Cures (10 per cent.) are seen only when treatment is energetic and early. The best results follow careful hygiene antiseptic baths protection with boricated vaseline. One gramme of quinine is given by mouth daily but arsenic and sulphoramides are not recommended.

Sydney Thomson

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DERMATOLOGY AND FUNGUS DISEASES

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Sydney Thomson

VIEIRA (João Paulo) Fogo selvagem Uma curiosa dermatose
[Wild Fire (Pemphigus Foliaceus)]—*Folha Med* 1942 Oct
25 Vol 23 No 20 pp 217-219

Fogo selvagem (Wild Fire) is the colloquial designation of *Pemphigus foliaceus* a truly terrible condition when fully developed. It was spoken of as a very rare disease of the skin by CASRAVE in 1800 and by various writers since then particularly in Brazil though it has been reported from Russia. It is more often seen in São Paulo where it has been observed for the past half century. The patient feels as if he were on fire (hence the name) and almost the entire skin may separate. In São Paulo there is a hospital where it is specially studied. It is characterized by bullae starting usually on the front of the chest but it may extend to involve the whole body. Pain is severe and the suffering intense both from heat and cold because of the denudation even the nails may be shed and joints become fixed. Sometimes the skin later becomes thickened in places producing a pachydermatous pseudo-elephantiasis condition. Happy is the man who dies in the earlier stages of the disease says the author. Its cause is quite unknown it is not contagious [but see preceding abstract]. It seems to occur mostly in rural districts where there are gullies and streams and often many insects one of which may be a vector. Dietetic deficiencies have of course been incriminated but there is no evidence of any value to support the idea. Treatment of every kind has been tried without any consequential benefit. Daily baths afford relief. Antisera anti toxins endocrine preparations arsenicals sulphonamides vitamins have all proved unavailing. [See this *Bulletin* 1927 Vol 24 p 401 and for the benefit following the use of chaalmoogra in pemphigus this *Bulletin* 1923 Vol 20 p 289] H Harold Scott

SATLISKI (Emanuel M) Dermatitis Venenata caused by the
Manzanillo Tree—*Arch Dermat & Syph* 1943 Jan Vol 47
No 1 pp 36-39

Hippomane mancinella L. family Euphorbiaceae is a poisonous tree which is found on both sides of the isthmus and commonly along the sea shores throughout Panama and the Canal Zone. It often forms dense thickets along the beaches and is easy to recognize. The common name is the manzanillo tree the names beach apple and shore apple are more recent ones. The fruit is bright red 2.5 cm in diameter and shaped like an apple. Leaves branches and fruits when cut or bruised exude a latex which is highly irritant to the skin producing a severe vesicular eczematization similar to that caused by *Rhus toxicodendron*. The material is also irritant to the mucous membranes particularly the conjunctivae when the leaf or fruit is eaten such severe oedema of the oesophagus may be excited that tracheotomy becomes imperative. Dew falling from the leaves contains sufficient toxin to cause marked reaction in many individuals. The best treatment is to immerse the affected part in sea water for half an hour a bathing which not only relieves the symptom but does also seem to be definitely curative. So true is this that the men working in the Canal Department are all instructed to plunge into the sea if necessary.

A case is described in full and reference is also made to related trees which are recognized as being sources of severe eczematization the *Hura crepitans* (the sand box tree) and two species of the genus *Sapium*
Sidney Thomson

GONZALEZ OCHOA (Antonio) El micetoma por *Actinomyces mexicanus* Boyd y Crutchfield 1921 en Mexico [Mycetoma due to *Actinomyces mexicanus* in Mexico]—*Rev Inst Salubridad y Enfermedades Trop Mexico* 1942 Dec Vol 3 No 4 pp 303-317 With 11 figs on 4 plates English summary (3 lines)

In view of the importance of fungal diseases in North America the author proposes to undertake a study of them afresh. In this article he deals solely with *A. mexicanus*. He describes seven cases in detail the history of progress being very similar in all—a papular nodule painful at first not later multiplying and breaking down in two months or so and extending but causing no fever and little or no constitutional disturbance though the lesions may have persisted for years. The site involved varied—foot leg thigh abdominal wall thorax.

A description of the growth obtained on Sabouraud glucose (2 per cent) and on Pate and Czapek's agar is given. The strain isolated differs in some essential particulars from that described as *A. mexicanus* by BOYD and CRUTCHFIELD in 1921 but as there were considerable variations in the characters of the growths obtained by the author in his cases he does not think the differences from the Boyd and Crutchfield growth warrant his regarding his own as of a different species. The characters of the main species of *Actinomyces* which cause mycetoma and of the strains isolated by the author are clearly set out in a Table [The illustrations are well reproduced both of the clinical conditions and of the growth characters] H Harold Scott

DU TORR (C. J.) Sporotrichosis on the Witwatersrand—*Proc Transvaal Mine Med Officers Assoc* 1942 June Vol 22 No 241 pp 111-127 With 37 figs [26 refs]

A detailed and clear history of our knowledge of sporotrichosis shows that it must now be regarded as frequently of industrial origin. Thus in less than a year 650 cases have occurred among men working in one shaft. At first natives only were affected but more and more cases were seen among Europeans as the epidemic spread. Increased experience led to increased knowledge and detection became more accurate. In the same way more cases have been reported from America mostly among farmers florists and manual workers. The polymorphic features of the disease need to be better known as there may for instance be spread from this particular mine. Many clinicians still tend to think only of the lymphangitic type forgetting that ulcerative and other forms are seen. The lesions often resemble those produced by syphilis tuberculosis and pyogenic infections such as osteomyelitis. Single or multiple unrelated nodules or ulcers may be situated on practically any part of the body and may be difficult to diagnose if the possibility of this disease is forgotten. It is curious that lesions have never been reported on the feet or in the region of the pelvic girdle. The lesion is obviously granulomatous but suspicion may only arise because of its chronicity lack of response to ordinary treatment and absence of any degree of pain or constitutional symptoms. Sinuses and verrucose formations are suspicious. There is often spread into the deeper tissues round the obvious lesion. The pure pus is a dull yellow colour but blood contamination often makes it salmon pink. The primary lesion always follows an injury such as a

cut or an abrasion. This may not heal but even if it does so it breaks down again. Then a week later the edges become thickened and the open wound covered with granulomatous fungating tissue penetrated by sinuses. At first there may be close resemblance to a boil if infection has occurred through a hair follicle. Systemic infection has not yet been recognized. Diagnosis may be confirmed by the examination of direct smears by culture or by inoculation of a white rat. The fungi isolated all conform culturally to *Sporotrichum beurmanni*. Agglutination and skin tests have been devised and seem to be reliable. Treatment is always effective. potassium iodide is given to a total of about 3 000 grains. It is usual to start with 15 grains three times a day and to work up to one drachm thrice daily. The pathological changes are described and may be indicated briefly as those of a reticulo-endothelial response. The epidemiology and prevention of the disease in mines naturally receive very full consideration. The fungus which appears to have been introduced into certain mines grows well on timber and on mine mud. It can grow well wherever there is moisture and organic material. Various antiseptics have been tested but most are ineffective in practicable dilutions. For rooms and clothing formaldehyde gas is successful. the author advocates doubling the standard dose of 5 oz formalin for 1 000 cubic feet for 10 hours or increasing the period. Investigations are continuing. The photographic illustrations are excellent and helpful.

Sydney Thomson

WEISE (E C) Prevalence of Sporotrichosis in Connecticut. Review of Three Cases and Report of New Case — *Connecticut State Med J* 1942 Nov Vol 6 p 841 [Summary taken from *Jl Amer Med Assoc* 1943 Jan 2 Vol 121 No 1 p 75]

Weise reports his third case of sporotrichosis the fourth to occur in Connecticut. The disease may be mistaken for syphilis as the ulceronodular and gummatous lesions may bear a close similarity to cutaneous gummas. Certain types of cutaneous tuberculosis and at times low grade streptococcal lymphangitis may be imitated. The general practitioner should consider it as a possible diagnosis in obscure ulcerative ulceronodular and gummatous conditions particularly when the lymph nodes appear to be involved. Cultures from areas which have broken through the skin either will not reveal the fungus or they will be grossly contaminated with staphylococci and other organisms. Pure cultures can almost invariably be obtained by utilizing previously unopened lesions. The three other culturally proved cases of sporotrichosis which have occurred in Connecticut are reviewed. The physician should familiarize himself with the various manifestations of the disease so that its true incidence may be ascertained and its otherwise prolonged period of disability avoided by appropriate management.

SKEER (Jacob) Sporotrichosis. Report of a Case of Localized Lymphatic Type Originating in New York City — *Med Times* 1943 Jan Vol 71 No 1 pp 7-11 With 5 figs [16 refs]

The report of a case occurring in a white man aged 63 years and a native of New York City. There is a well substantiated story of his having been bitten by an insect on the tip of the left fourth finger during December 1940. Thereafter this area became swollen and inflamed. Later several boils appeared on the back of the left hand gradually

spreading up the forearm to the elbow. When he was seen in March 1941 there were several small pinkish nodules on the little finger only one of which had broken down to exude some blood and pus. Numerous raised firm bluish and violet nodules varying in size from that of a pea to that of a bean were seen on the back of the hand in the web adjacent to the fourth finger and as a linear formation on the back of the forearm. The site of the original bite showed as a nodule with crater like necrotic centre and surrounding induration and pigmentation. *Sporotrichum schenki* was successfully cultivated on Sabouraud's peptone dextrose agar. All other investigations proved negative and the patient recovered on potassium iodide. Sydney Thomson

PRUNES (Luis) & FREY (Juan R) Cromoblastomycosis [Chromoblastomycosis]—*Rev Argentina de Dermatofilologia* 1942 Vol 26 Pt 4 pp 1200-1205 With 5 figs

The patient was an agricultural labourer 25 years of age who when seen by the authors stated that the lesion had started after a prick by a thorn five years before. By this time the foot and lower part of the left leg were swollen verrucose and bathed in fetid seropurulent discharge. The thigh was not affected but the groin glands were enlarged and hard though painless. Culture on Sabouraud's medium gave rise to two growths one was whitish and creamy *Oidium albicans* the other yeast like of the *Rhodotorula* genus. Treatment by sodium iodide by mouth intravenously and by ionization gave partial amelioration. Amputation was at one time debated but scraping under local anaesthesia and electro-coagulation succeeded in so far that the patient was able to leave hospital after nine months. He did not return and the further progress cannot therefore be recorded. H Harold Scott

TROPICAL OPHTHALMOLOGY

A REVIEW OF RECENT ARTICLES VLI*

The clinical picture of sore eyes with denudation of the skin at the canthi in association with angular stomatitis is very familiar in many parts of the tropics and AYKROYD and VERMA¹ have studied the condition amongst patients attending the Madras Government Ophthalmic Hospital in order to ascertain the influence of riboflavin deficiency in causing the trouble. A low grade superficial keratitis with some circumcorneal injection was found in the majority of the cases. Dots and streaks of opacity could be detected in the superficial layers of the cornea some of these stained faintly with fluorescein and superficial ulceration was occasionally observed. The patients were treated solely by intramuscular injections of lactoflavin B D H. An initial injection of two milligrammes of the drug was given and this was followed by daily injections of from one to two milligrammes. Improvement occurred rapidly and all subjective symptoms disappeared in 3-12 days. Signs of riboflavin deficiency however tended

For the 40th of this Series see Vol 39 pp 886-890
 1 AYKROYD (W R) & VERMA (O P) Superficial Keratitis due to Riboflavin Deficiency—*Indian Med Gaz* 1942 Jan Vol 77 No 1 pp 1-5
 With 1 fig on plate [16 refs]

to recur within a short period on ceasing the administration of the vitamin. At this time it was not possible to treat more than thirteen patients owing to a shortage of the drug, but VERMA² was later able to treat a further fifty cases with equal success.

ARNOLD and WHILDIN³ have reported from North Carolina, U.S.A. a case of infection of the conjunctiva by *Rhinosporidium seeberi*. The patient was a white boy aged eight who had lived in North Carolina all his life; the source of infection was not apparent. Two cases of the disease had however been previously reported recently from that part of the world. The polypus was attached to the outer portion of the lower fornix and its nature being suspected was thoroughly eradicated. No recurrence has taken place after a lapse of two years. The polypus is described as a pink fleshy growth covered by vascular glistening conjunctiva beneath which yellowish flecks stood out against the red background. [No mention is made of the strands of fibrous tissue resembling the midrib and veins of a leaf which usually pervade these polypi.]

SANYAL and MAITRA⁴ have claimed remarkable success in the treatment of some diseases of the eye common in Calcutta by the use of a 5 per cent. sulphanilamide ointment. A form of infectious keratoconjunctivitis with adenitis which in many respects resembles trachoma but which does not lead to cicatrization is frequently met with. The disease is aggravated by irritation and caustic treatment but rapidly yields to the application of the ointment. The lachrymal sac may become infected and this may be relieved by placing a few drops of a 0.5 per cent. solution of sulphanilamide in the sac and subsequently using the ointment. Even post-operative sepsis was controlled by the use of this ointment and striking results were achieved in a case of post trachomatous xerosis. Corneal leukomata too responded favourably to the treatment. The author found that in the rabbit's eye application of the ointment induced a general hyperplasia of the conjunctival and corneal epithelium and a swelling of the corneal corpuscles.

POLEFF⁵ has found that a positive Weil-Felix reaction and a positive Weigl reaction may be obtained in a higher proportion of certain trachoma infections than in controls. He points out that normal serum in weak solution may prove positive and dilutions greater than 1:100 of the serum tested should therefore be avoided.

The experience of FREUDENYHAL⁶ with sulphanilamide in the treatment of trachoma has been very favourable. He used a preparation called albogal (tablets each containing 0.4 gramme of sulphanilamide) and gave a daily dose of 4-6 tablets for five or six days and followed this by an intermission for two days. Suitable local

¹ VZ (O.P.) Fifth Expertise of the Treatment of Sporadic Infection of the Eye with Riboflavin—*Indian Medical Gazette* 1942, A, Vol. 77, No. 8, pp. 471-472.

² ARNOLD (Ralph) & WHILDIN (James) Rhinosporidiosis of the Conjunctiva—*American Journal of Ophthalmology* 1941, Oct. Vol. 13, No. 10, pp. 1227-1230. With 4 figs.

³ SANYAL (Sudat) & MAITRA (Nand) Ocular Conditions Common in India and the Local Treatment with Sulphanilamide—*Indian Ophthalmology* 1941, July, Vol. 23, No. 1, pp. 27-56. With 21 figs.

⁴ POLEFF (L.) Z. Frage der Reaktion von Weigl-Felix bei Trachom—*Ophthalmologische* 1941, Sept. Vol. 110, No. 3, pp. 111-113. [3 refs.]

⁵ FREUDENYHAL (E.) Sulphanilamide in the Treatment of Trachoma—*Lab. & Medicine* 1941, July, Vol. 13, No. 1, pp. 3-37.

treatment was employed at the same time. Conjunctival lesions due to the disease showed little or no response but corneal complications were strikingly benefited.

HOGAN and CRAWFORD⁷ have described an epidemic of *superficial punctate keratitis* which occurred in San Francisco during the last quarter of 1941. Employees in shipbuilding yards were chiefly affected and over two hundred patients were treated. The disease began with an acute conjunctivitis and an oedema of the caruncle and semilunar fold spread over the lower fornix and the bulbar conjunctiva. Conjunctival discharge was absent and relatively slight discomfort was experienced. Some glandular involvement was present in most of the cases. The corneal lesions corresponded to those described in other epidemics and were mostly situated in the superficial layers of the propria just beneath Bowman's membrane. Deep forms were also observed with wrinkling of Descemet's membrane and iritis. Staining with fluorescein did not occur. No special treatment was found particularly useful and the disease tended to undergo spontaneous cure. The authors suggest that the disease should be called epidemic keratoconjunctivitis.

WEINER GAYON and OSHERWITZ⁸ have reported from Cincinnati an ulcer of the upper lid caused by *granuloma venereum* (not to be confused with lymphogranuloma inguinale). The patient had suffered two years previously from a cratering ulcer of the penis and when under treatment for resulting urethral stricture developed an extensive ulcer of the upper lid which caused necrosis of a large portion of the tarsus. Large monocytes containing Donovan bodies were found on histological examination. Rapid healing took place on the administration of injections of 1 per cent tartar emetic solution.

ESPILDORA and COURTS⁹ consider that *lymphogranuloma inguinale* may be accompanied by many different ocular complications and describe a form of chronic conjunctivitis due to the disease which resembles Parinaud's syndrome. Chronic conjunctivitis also occurs and may lead to pterygium. Ophthalmoscopic examination of 30 patients suffering from the disease revealed in almost every case the presence of peripapillary oedema, hyperaemia and tortuosity of the retinal vessels.

ESTRADA¹⁰ states that by using an electric ophthalmoscope with a plus 40 dioptre lens in the sight hole he has had no difficulty in detecting microfilariae in the vitreous of patients suffering from *onchocerciasis*. Eleven such patients were examined by him and microfilariae were found in all. He remarks that the parasites may be seen in the vitreous even when obvious signs of *onchocerciasis* are absent.

HOGAN (Michael J.) & CRAWFORD (Joseph W.) Epidemic keratoconjunctivitis (Superficial Punctate Keratitis Keratitis Subepithelias Keratitis Maculosa Keratitis Nummularis) With a Few of the Literature and a Report of 125 Cases—*Am J Ophthalmol* 1942 Sept Vol 25 No 9 pp 1059-1078 With 8 figs [87 refs]

* WEINER (Alfred L.) GAYON (Irwin E.) & OSHERWITZ (Norris S.) Granuloma Inguinale of the Eyelid Report of a Case—*Am J Ophthalmol* 1942 Jan Vol 26 No 1 pp 13-18 With 5 figs

* ESPILDORA (Christobal) & COURTS (Waldemar E.) Lymphogranuloma Venereum Lesions of the Eyes—*Am J Ophthalmol* 1942 Aug Vol 25 No 8 pp 916-925 [49 refs]

* ESTRADA (Antonio Torres) Ophthalmoscopic Observation of Microfilariae in the Vitreous of Patients Infected with *Onchocerciasis*—*Am J Ophthalmol* 1942 Dec Vol 25 No 12 pp 1445-1449

The Annual Report of the Madras Government Ophthalmic Hospital for the year 1941¹¹ shows that 35 939 out patients and 5 710 in patients were admitted during the year. The hospital has 170 beds but the daily average of in patients was 322 many patients being accommodated on the ward verandah. In the out patient department 1 825 patients were admitted for trachoma 954 for glaucoma 6 130 for cataract and 154 for keratomalacia. Superficial punctate keratitis is still fairly common 55 cases of the disease being treated. It is interesting to note that 25 cases of an injury to the macula lutea were seen during the year. Excision of the lacrimal sac for dacryocystitis was carried out 441 times. The combined extraction operation—capsulotomy and iridectomy—was still favoured for senile cataract 2 061 of such operations were performed but only 34 intracapsular operation. Sclero-corneal trephining maintains its supremacy in the operative treatment of glaucoma.

H Kirkpatrick

OBERHOFF (K.) Albusidbehandlung des Trachoms (The Treatment of Trachoma with Albucid—*Deu. Militararzt* 1942 Sept Vol 7 No 9 pp 248-253 24 ref 1)

After reviewing German and foreign experiences on the treatment of trachoma with sulphaphenylamide the author reports a series of 70 cases personally observed in which albucid by mouth was used. His conclusion is that whilst albucid is of considerable value in the treatment of this affection it is possible that such improvement as is noticeable is due to its effect on secondary infection rather than on the trachoma itself. It is of interest to note that judging by the review of German experiences the same cleavage of opinion on its value as was observed in other countries obtained in Germany. Reports ranged from total enthusiasm to denial of any effect.

Arnold Corsi

PERGOLA (Alfredo) Un triennio di attività del reparto oculistico (Resoconto clinico-statistico degli anni 1937-1938-1939) (Three Years of Activity in an Eye Department in Eritrea.)—*Boll. d. Soc. Italia d. Med. e Ig. ne Trop.* (Ser. Eritrea) Asmara 1941 Vol 1 No 1 pp 28-59 With 5 figs. En l.h. summary

MISCELLANEOUS

RAMES (C.) Beni Abbas (Sahara oranais) Etude historique géographique et médicale [A Historical Geographical and Medical Study of Beni Abbas.]—*Arch. Inst. Pasteur d'Algérie* 1941 Mar Vol 19 No 1 pp 80-157 With 1 map 1 plan & 28 figs on 10 plates. [Ref. in footnotes]

Beni Abbas is in southern Algeria 150 miles south of the Atlas mountains and on the border of the great Saharan plain. The scope of this paper is indicated by the title. It is illustrated by a series of most attractive photographs. Malaria is endemic as was pointed out recently by FRAYANI [this Bulletin 1940 Vol 37 p 496] the anophelines found are 4 multicolor *A. stephensi* *A. sergenti* and

MADRAS Annual Report and Statistics of the Government Ophthalmic Hospital Madras for the Year 1941—14 pp 1941. Madras Government Press. 8 annas.

A d thali Control by *Gambusia* is promising A few cases of typhus and relapsing fever have been found and one case of oriental sore Beni Abbès appears to be the southern limit in these regions of distribution of oriental sore the sandflies identified are *P papalaci* *P parroti* *P fallax* and *P minutus* Measles whooping cough and cerebrospinal fever have been observed but smallpox has practically disappeared as a result of vaccination though it could break out in the unvaccinated women or nomads

Cases of tuberculosis were not seen but tuberculin tests indicated infection in 40.3 per cent of adults

Infant mortality is low from 38 to 100 per 1 000 births [presumably live births] and breast feeding is good After the first year however gastro intestinal infections rickets and bronchopneumonia take a higher toll Trachoma is widespread syphilis is common but gonorrhoea less so Of the intestinal worms *Enterobius* and *Ascaris* are exceedingly common *bilharzia* has never been seen Fleas are rare but lice are abundant Scorpions and snakes are common

Wounds heal quickly and phagedaenic ulcer is not reported The authors give an account of native medical practices Dietetic resources are good cereals vegetables grapes and dates are plentiful and use is made of animal food and fresh water fish There is no mention of deficiency disease other than rickets

C II

DEGOTTE (J) & ZANETTI (V) Diagnostique demographique d'une peuplade Mabudu au Nepoko (Kibali Ituri) [Demographic Studies in Nepoko]—*Rec Travaux Sci Méd Congo Belge* Leopoldville 1942 Jan No 1 pp 125-134

During the course of a recent medical census undertaken in three districts of the Mabudu tribe situated in the basin of the Nepoko Belgian Congo the authors assembled a mass of demographic data which they later analysed they now present the results of their work Some 37 000 persons were dealt with but in addition to the actual data assembled in the course of this specific operation the authors used for purposes of comparison and verification of their own analyses and results the data made available from the investigations of earlier workers The results of the enquiry are set out in a series of carefully prepared tabular statements in the Table presenting the total population figures in five yearly age groups the methods applied for the estimation of these groups are not precisely described but evidently great care has been exercised in this as in other branches of the work for it is explained that every endeavour was made to establish ages with the greatest possible exactitude Interference with normal population development among the peoples under review during the period 1915-1930 is ascribed to such influences as the absence of adult males to engage in gainful employment at places remote from their homes to the wide distribution of venereal diseases and to other external though non racial causes Favourable reactions to former adverse influences are now noticeable and it is believed that provided no new external influences of harmful character arise to disturb present progressive improvement the tribe will become a biologically sound population

P Granville Edge

BERCOVITZ (Z) A Summary of Preventive Methods in Certain Tropical Diseases—*Amer J Digestive Dis* 1942 Oct Vol 9 No 10 pp 327-329

SMITH (E. C.) Child Mortality in Lagos, Nigeria.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1943, Mar., Vol. 36, No. 5, pp. 287-303. With 1 graph & 18 figs on 8 plates [18 ref.]

The author made post mortem examinations on 500 children of ages up to three years whose deaths had not been medically certified. The examination was as complete as possible and included microscopic examination of paraffin and frozen sections and of smears and bacteriological investigations.

The 500 children comprised 259 males and 241 females and formed about 17 per cent of the total number of deaths in that age group. There were 181 aged 0 to 6 months and 112 from 7 to 12 months old, 137 from 13 months to 2 years and 70 from 2½ months to 3 years. When information as to age was inaccurate an estimate was made from the dentition and the body growth.

Causes of death—The author summarizes the chief causes of death as follows—

	No of cases	Percentage
Respiratory disease	343	68.6
Malaria	7	1.4
Diseases of the alimentary tract	20	4.0
Meningitis	18	3.6
Anemia	14	2.8
Malnutrition (fatty liver) and/or starvation	14	8
Constitutional growth	8	1.6
Miscellaneous	11	2
Total	500	

Respiratory diseases—The 343 cases were composed of the following—

Bronchopneumonia	266	Pleurisy	3
Lobar pneumonia	6	Diphtheria	1
Pulmonary tuberculosis	3	Empyema	1
Abscess of lung	3	Gangrene	1

Bronchopneumonia—While being the primary cause of death in 76 children this was present in all the 500. In 15 of the 276 cases there were also present certain visceral lesions suggestive of typhoid fever which the author terms abdominal syndrome a condition frequent in young adults and characterized by splenic enlargement and congestion of the spleen mesenteric lymph nodes and the lymphoid tissue of the caecum ascending colon and proximal few feet of the ileum.

The fatal bronchopneumonia cases could be classified into haemorrhagic bronchiolitic and interstitial groups. Pneumococci were isolated 133 times (34.4 per cent) from 382 cases by inoculation of mice and the results are shown in a table. Type 6 was found in 61 cases (45 per cent) while Types 1, 2 and 3 were rare. Other organisms were isolated from 47 of the children including streptococci in 23. *Staphylococcus aureus* was found in three cases of lobar pneumonia and was associated with pleurisy, abscess and empyema.

Pulmonary tuberculosis was of an acute type in 25 of the 32 cases there were also tuberculous lesions in the spleen kidney liver and abdominal lymph nodes and in six there was tuberculous meningitis. Many of these lesions showed no well defined tubercles or giant cells but acid fast bacilli were present.

Diphtheria was the cause of death in one child only. The organism was isolated and was investigated by Dr ELMES who found it virulent for a guinea pig. *Diphtheria* is a rare disease in Lagos.

Malaria was the primary cause of death in 72 of the children. In addition to these 162 showed much pigment in the liver and the author considers that malaria was probably a contributory factor in these cases. As regards ages at death 18 all cerebral in type occurred at 0 to 6 months 24 at 7 to 12 months 19 at 13 months to 2 years and 11 at 25 months to 3 years. The heart muscle showed well marked degeneration in 18. Haemoglobinuria with degenerative changes in the kidneys was observed in 2.

Diseases of the alimentary tract—These included colitis (9) amoebic dysentery (3) and hookworm infection (1). Helminths were found in 183 (36.6 per cent) of the children. *Ascaris* being the most frequent. Hookworm and *Trichuris trichiura* were few in number though often present.

Meningitis—Pneumococci were isolated from 15 of the 18 children who died of meningitis (excluding tuberculous meningitis). In three instances the type was different from that in the lungs indicating that the meningitis was not secondary to the lung infection.

Anaemia—This included six deaths from acute sickle cell anaemia and four from splenic anaemia.

Malnutrition—Avitaminosis was indicated by the naked eye and histological findings in four of the 14 children of this group. The liver cells showed very marked fatty changes and the convoluted tubules of the kidneys also showed fatty degeneration. Such lesions have been attributed by CLARK to the action of certain native food stuffs especially cassava and coco yam. The author therefore determined the incidence of these changes and of albuminuria in the 500 children. Albuminuria was present in 180 (86 per cent) of 208 examined and frozen sections of 350 specimens of kidney showed well defined fat changes in the cells of the convoluted tubules in 112 (32 per cent). There were varied degrees of fatty change in the liver cells in 290 (58 per cent) of the 500 children and in 49 the condition was extreme.

Although these findings support Clark's thesis the author thinks it unwise to advance any conclusions in the absence of comparative figures from other parts of West Africa.

Congenital group—This included three cases of icterus neonatorum one of cystic kidney, one of hydrocephalus one of patent foramen ovale one of bilateral suprarenal haematoma and one of syphilis.

Miscellaneous—Biliary cirrhosis caused two deaths and myocarditis caused one. A male child aged one year.

The paper is illustrated by 18 photographs. They include eight photomicrographs of pneumonia, two of tuberculous lesions (kidney and spleen), one of focal necrosis of the liver in lobar pneumonia and two which show foetal stages of glomerular development in the kidney of an infant aged one month. The others are photographs of supra-renal haematoma, of cross sections of spleen and lymph node and of the caecum and ileum.

J F Corson

(RANT (Alan) & BARWELL (Cland) Chronic Melioidosis. A Case Diagnosed in England.—*Lancet* 1943 Feb 13 pp 199-201

Melioidosis a glanders like condition occurring in the Far East was discovered in Rangoon by WHITMORE in 1912 at post mortem examinations and subsequently demonstrated in life by STANTON in Malaya. Primarily a disease of rodents due to *Pfeifferella whitmori* it is transmitted occasionally to man in some way as yet unascertained producing a highly fatal disease characterized by the formation of multiple infective granulomata. The majority of patients die in the acute stage rarely it may pass into a subacute or chronic form. Of the 83 cases recorded by STANTON and FLETCHER in 1937 all but 2 were fatal within 21 days of onset.

The case recorded by the authors of this paper is of considerable interest not only as a careful study of that rare condition chronic melioidosis but also because it is the first case of melioidosis diagnosed in this country. The patient a regular soldier served in Singapore from 1935 to 1938. He did three months duty in Penang in 1938 during which time he was in rat infested quarters. He contracted gonorrhoea in January 1938. In May 1938 two months after returning from Penang he developed arthritis of the right hip and in June arthritis of the right ankle. After transfer to Gibraltar in December 1938 the gonorrhoea recurred but responded to sulphadiazine and prostatic massage. He returned to England in February 1941 and remained free of symptoms until June 1941 when he developed bilateral bronchopneumonia accompanied by a recurrence of pain and stiffness in the right hip. The pneumonia responded to sulphapyridine. The blood showed a moderate degree of anaemia with a normal leucocyte count, urine and stools were normal. Blood culture (repeated), gonococcal fixation test, Wassermann reaction and Mantoux were negative and the Widal consistent with T.A.B. inoculation. The blood sedimentation rate was 26 mm. The temperature fell to normal in 10 days and the pain in the hip subsided. Fever recurred from time to time but by October full and painless movement of the joint was obtained. All laboratory investigations remained negative except the Wassermann and Kahn reactions, which had now become positive. The patient was given a course of T.A.B. bismuth and potassium iodide. The Wassermann and Kahn reactions were still positive in November 1941 but became negative in May 1942. In January 1942 pain in the hip joint recurred and he developed pneumonitis in both lower zones and a right peroneal palsy with foot-drop. Brawny swelling appeared over the left forehead, the left parotid and both external malleoli. X-ray of the skull showed local osteomyelitis. Abscesses slowly formed which healed well after incision and curettage. In April 1942 pain in the back developed and in July a large perispinal abscess was revealed by X-ray with partial destruction of the 4th and 5th dorsal vertebrae. In February 1942 the patient developed a urethro-rectal fistula. Repeated blood transfusions were given they relieved the anaemia and sustained the patient. Sulphapyridine, sulphathiazole and sulphadiazine all controlled the temperature the last being the most effective. None had any effect on the formation of abscesses.

Pfeifferella whitmori was isolated from pus obtained from the lesions of the parotid gland, forehead and ankle. It agreed in cultural character with some minor differences with the description given

by Stanton and Fletcher for rough strains of *Pf whitmori*. It was pathogenic for the mouse and guinea pig particularly the latter and gave the Strauss reaction in male guinea pigs. The mice showed a glairy peritoneal exudate with numerous small necrotic foci in the spleen and liver. *Pf whitmori* was grown from the heart blood. Male guinea pigs showed somewhat similar findings with in addition obvious testicular swelling and patchy periorchitic deposits of pus the heart blood grew *Pf whitmori*. Histologically the lesions consisted of foci of acute pyogenic inflammation in which karyorrhexis was a feature. The patient's serum agglutinated his own organism to a titre of 1 in 200 but failed to react with a strain of *Pf whitmori* obtained from the National Collection of Type Cultures. This culture was avirulent for the mouse and gave a smooth type of growth.

The authors discuss the question of the date of onset of melioidosis in their patient. Infection must have been acquired early in 1938. If the arthritis developing in May 1938 constituted the first signs of infection the onset was insidious which is unlike previously described cases of melioidosis. The arthritis may have been gonococcal in which case the initial sign of melioidosis would be the bronchopneumonia of June 1941 making an incubation period of three years.

S P Bedson

RICHARDS (Henry) Desert Sores [Correspondence.]—*Brit Med J*
1943 Mar 13 pp 334-335

The author has not been able to satisfy himself that dietetic insufficiency plays any important part in the causation of desert sore. As a result of his experience with the troops in East Africa he considers the principal factors to be—(1) Liability to trauma under Service conditions (2) Lack of facilities for good personal hygiene (3) Flies. In treatment he advocates gentle cleansing and the application of elastoplast so as thoroughly to occlude the ulcer. This dressing should be changed at intervals of 5 days and the majority of sores are well healed after three applications. Sulphanilamide powder may be used covered with vaseline gauze and elastoplast with good results but lotion dressings are to be deprecated unless they can be changed frequently enough to prevent drying and sticking.

C H

CLELAND (J Burton) Injuries and Diseases in Australia Attributable to Animals (Insects Excepted)—Series V Mammals Fish Spiders
Mites and Ticks et cetera Shell Fish Sponges Protozoa—*Med J*
Australia 1942 Oct 3 29th Year Vol 2 No 14 pp 313-320 [49 refs]

DERBENEVA UKHOVA (V P) Influence de la temperature sur les larves de *Musca domestica* L. [Influence of Temperature on Larvae of *M domestica*]—*Med Parasit & Parasitic Dis* Moscow 1940 Vol 9 No 5 pp 521-524 With 2 graphs [In Russian]
[Summary taken from *Rev Applied Entom* Ser B 1943 Feb Vol 31 Pt 2 p 27]

In the experiments described which were carried out to ascertain the effect of medium and high temperatures on the development of larvae of *Musca domestica* L. newly hatched maggots were placed in

tumblers on fresh dung which was renewed daily and kept at a relative humidity of 70-80 per cent and constant temperatures of 25-43 C [77-109.4 F]. The larval stage was shortest (averaging 3.1 days with a minimum of 2.5) in pig dung at 34 C [93.2 F]. In horse dung it averaged least (4 days) at 36 C [87.8 F]. It lasted about 7.5 days in pig dung and 6.5 days in horse dung at 25 C and about 5 days in both at 43 C which is evidently not the upper thermal limit. Larvae about to pupate endeavoured to leave the dung at 36 C and above and the number of individuals that did so increased as the temperature rose. Those that remained pupated but the percentage mortality among pupae that developed at 36-43 C varied directly with the temperature. All the larvae pupated and gave rise to normal adults when transferred at the beginning of the prepupal stage from high temperatures to 25 C. Development in pig dung was quicker at all temperatures except the extremes than in horse or cow dung and larvae reared on it were larger. This is thought to be due to the favourable humidity of pig dung which is intermediate in this respect between the other two.

The effect of temperature on the activity of larvae in the second and third instars and those about to pupate was determined by placing larvae reared at 25 C on damp filter paper on a cooled or warmed surface and measuring the distance they covered. The range of temperature at which they were active and the optimum for activity were 10-42 C [50-107.6 F] and 35 C [95 F] for second instar larvae 8-45 C [46.4-113 F] and 36 C for the third instar and 5-43 C [41-109.4 F] and 29 C [84.2 F] for those about to pupate. The activity of second instar larvae decreased considerably at temperatures above the optimum and much more so than that of the third instar. There was no apparent decrease in the activity of the larvae ready to pupate.

DERBENEVA UAKOVA (N. P.) Adaptation des larves de *Musca domestica* L. à des hautes températures [Adaptation of Larvae of *M. domestica* to High Temperatures]—*Med. Parasit. & Parasit. Dis.* Moscow 1940 Vol. 9 No. 5 pp. 525-577. With 1 graph. [In Russian.] [Summary taken from *Rev. Applied Entom.* Ser. B 1943 Feb. Vol. 31 Pt. 2 pp. 27-28.]

Larvae of *Musca domestica* L. were observed developing in large heaps of horse dung at over 40 C [104 F] and occasionally even at 48-49 C [118.4-120.2 F] a temperature that appeared to be too high for larval activity in the laboratory [see preceding abstract]. Since the laboratory results may have been affected by the sudden transference of the larvae from moderate to high temperatures experiments were carried out to ascertain whether they can adapt themselves to gradually increasing temperatures. In the field the temperature of the horse dung on which the eggs are laid and the larvae begin to develop seldom exceeds 35 C [95 F] but if the dung is piled into large heaps it ferments and becomes heated so that the temperature just below the surface may be above 40-45 C by the time the larvae reach the third instar. In the experiments therefore eggs were placed at 3-33 C [89.6-91.4 F] and the temperature was subsequently increased gradually so that the larvae of the third instar developed at a maximum of 44-48 C [111.2-118.4 F].

The adaptation of the larvae was demonstrated by the effect of temperature on their activity and by the rate of mortality. The

temperature range of activity and the optimum for it were 12-48 C [53.6-118.4 F] and 41 C [104.9 F] for third instar larvae from the series in which the temperature was raised to 44 C whereas they were 8-45 C [46.4-113 F] and 36 C [95.9 F] for similar larvae bred at 25 C [77 F]. Thus larvae reared at the increasing temperature were more tolerant of high temperatures than those kept at 25 C they were also more sensitive to a decrease in temperature which lowered their activity more than it did that of the larvae reared at 25 C. The effect of high temperature on mortality was determined by placing larvae on pans heated to temperatures ranging from 39 to 51 C [87.8-123.8 F]. The fatal temperatures varied directly with those at which the larvae had been kept immediately preceding the test but all the larvae died at 51 C. The survival of the larvae in the field when the temperature of the dung is high may therefore be explained by their adaptation.

EGOROV (P I) Essai d'utilisation de la fumigation du sol comme moyen de la destruction des agglomérations de nymphes de mouches [Soil Fumigation for Destruction of Fly Pupae]—*Med Parasit & Parasitic Dis* Moscow 1940 Vol 9 No 5 pp 528-530 [In Russian] [Summary taken from *Rev Applied Entom* Ser B 1943 Feb Vol 31 Pt 2 p 28]

An account is given of experiments carried out near Odessa in view of the desirability of finding a soil fumigant that would be effective against pupae of *Ceratitis capitata* Wied. Since a sufficient number of pupae of this Trypetid were not available pupae of the house fly [*Musca domestica* L.] were collected from refuse dumps and placed in muslin bags at a depth of about two inches in the soil of field plots. The fumigants tested were paradichlorobenzene polychlorides [a mixture of chlorobenzenes] and a preparation called calcium cyanide that contained about 40 per cent sodium cyanide and the soil was covered with paper as soon as they had been applied. The edges of the paper were pressed down with earth and it was left in place for the period of exposure.

The best results (complete or almost complete mortality in three days) were obtained from the use of paradichlorobenzene applied at the rate of 1.2 oz or more per sq yd by strewing it over the surface of the soil or by dissolving it in kerosene and watering the soil with the solution. Since a few pupae gave rise to adults however it is considered that the period of exposure should have been longer. The effectiveness of paradichlorobenzene decreased when the pupae were placed at greater depths it killed many of them at a depth of 8 ins but not at 16 ins. Polychlorides applied in holes or poured over the surface of the soil were effective but not reliable even at high dosages it is considered that they would be of value against fly pupae if used at the rate of about 3 oz per sq yd but further tests are required. The cyanide killed up to 99 per cent of the pupae when used as a 2 per cent solution in water and applied at the rate of 1.8 or 2.4 oz per sq yd but was unsatisfactory when the dry flakes were introduced into the soil even if the latter was damp after rain. A bitumen emulsion diluted with water was sprayed over the treated soil as a substitute for paper but did not give promising results. It is concluded from these experiments that the fumigants tested could be successfully used for the control of *M. domestica* in refuse.

known to be affected. The author refers to the terms infection potential, vector potential and transmission potential described by WHEELER and DOUGLAS below, pointing out that these apply to other rodent fleas as well as to rat fleas. He notes that in sylvatic plague focal occurrence and discontinuous distribution of the disease are characteristic; these features have not been satisfactorily explained.

CREEL (p. 303) gives an account of the plague situation in North America. The extension of the disease through the ground squirrel population has been slow, but unless control is effected it may spread to the rat populations of cities. The main reservoir is probably the ground squirrel population and rodents such as the chipmunk, marmot, wood rat and prairie dog probably do not have the density of population essential for the maintenance of an enzootic reservoir. For control the laboratory examination of rodents is essential and must be continuous, but the author estimates that with proper methods plague could be eliminated within five years by a campaign directed not against all rodents but against ground squirrel only. If the matter is neglected spread to the Eastern States may be expected.

In *Public Health Reports* (p. 303) it is noted that infection has been found in fleas from ground squirrels as far east as N. Dakota.

WHEELER and DOUGLAS (p. 616) point out that to evaluate the efficiency of an arthropod in the transmission of plague it is necessary to estimate the infection potential (proportion which become infected), the vector potential (proportion of infected individuals which actually transmit) and transmission potential (number of animals infected by one infective arthropod). They have calculated these figures for *Ceratophyllus montanus* and *Xenopsylla cheopis*.

Xenopsylla cheopis was originally found only in the seaports of the United States. RUNYER (p. 307) reports that it has been found permanently established at certain places in the interior of the country. In Vancouver, British Columbia, the *X. cheopis* index of two groups of rats was 2.17 and 3.47 (HOLLAND, p. 306) but no plague has yet been reported from that Province.

STEWART and EVANS (p. 616) state that in California *Hoplopsyllus atomus* is probably not so efficient a vector of plague as *Ceratophyllus montanus*, both of which are found on *Citellus beecheyi*. They have found that fleas collected at the mouths of rodent burrows give a highly accurate representation of the flea population of the rodents themselves. *C. montanus* predominates when the mean temperature is below 75° F. and *H. atomus* when it is above. Surveys from burrow mouths may therefore be expected to furnish information as to the appropriate time to begin prophylactic measures against sylvatic plague.

WHEELER *et al.* (p. 307) show that the flea *Echidnophaga gallinacea* is a parasite of ground squirrels in California; it also attacks the burrowing owl, which it itself is closely associated with the ground squirrel. This flea, collected from the owl, has been found infected with *P. pestis*, and this finding serves to show that the owl may be closely associated with the spread of plague.

MOLL and O'LEARY (p. 303) state that in Ecuador plague has been eradicated from ports and lowland towns but persists in some mountain areas. In the railroad towns rat and *X. cheopis* were implicated but in the mountains the guinea pig is the reservoir. Here the hygienic habits of the people are bad and it is thought that *P. leucurans*, the

human flea is the chief transmitting agent. The disease under these conditions however is rather endemic than epidemic and the incidence is not high. In Peru on the other hand plague is associated with the rat and the sylvatic form has not been reported. Important foci are found in the small villages the majority of cases are of the bubonic form.

DE LA BARRERA (p 305) records the occurrence of plague in three persons who had caught and skinned hares in the Province of Mendoza Brazil. In each case a villary buboes developed.

In Argentina plague is sylvatic in origin and D AMATO (p 763) states that most infected persons have been in contact with wild rodents but points out also that domestic rats are frequently involved. Control work is carried out by travelling brigades which attack domestic and semi domestic rodents. LOBO and SILVERI (p 305) report an outbreak of sylvatic plague in Tucuman Argentina in which field rodents and *R. alexandrinus* were involved and which led to at least 36 human cases in a period of 9 months. The rodents and fleas implicated are named.

PARDAL (p 762) describes a small outbreak of pneumonic plague which apparently took its origin from diseased field rodents. No rats were involved but the first human case was probably caused by an infected cat which itself had probably received its infection from field rodents.

GALE (p 302) reports an outbreak of pneumonic plague in an African reserve in the Kalahari. The origin was doubtful but the multi-mammate mouse (*Mastomys coucha*) or the springhare (*Pedetes capensis*) may have been implicated. The epidemic involved 37 persons of whom 36 died yet in spite of the close contact existing between the sick and the healthy the outbreak was not so extensive as might have been expected and was short lived. Vaccination was adopted as a control measure but it is not clear to what extent it was effective.

VINT (p 687) states that in Kenya there is no evidence to show that wild animals other than rats harbour plague.

SOKHEI (p 300) notes that in Bombay rats a steady reduction in susceptibility to plague took place between 1931 and 1936 but that by 1939 susceptibility was beginning to increase. He describes a serological test of agglutination of organisms contained in suspensions of liver or spleen of rodents dead of plague which may be valuable in diagnosis of the disease even in animals whose organs have become putrid.

In discussing the examination of rats for plague VINT (p 687) notes that it is useless to expect plague in rats caught in baited traps the plague rat is sick and is not attracted to bait. Dead rats are often decomposed when found and in that case bone marrow should be examined.

HENRIQUES (p 551) gives detailed instructions for the methods which should be adopted in the collection transmission and examination of rats and fleas for plague and a brief note on the bacteriological standards used in the identification of plague bacilli. These notes cannot be further abstracted.

Clinical Findings Diagnosis Treatment

VINT (p 687) considers it a mistake to classify plague into the forms bubonic septicaemic and pneumonic. In the bubonic form there

is an initial though transient bacteraemia and there is always a terminal septicaemia in fatal cases pneumonic plague ends by becoming septicaemic

WRIGHT (p 688) notes that in the recent outbreak of plague in Kenya cases were seen in which diphtheria or Ludwig's angina were simulated or in which lesions of the skin and subcutaneous tissues resembled carbuncles or in which cerebral symptoms pointed to a brain lesion

GOLDSTEIN (p 689) points out that the diagnosis of pneumonic plague may be difficult and in the earliest stages there may be little to be found except a marked discrepancy between the almost negligible physical signs and the gravity of the patient's condition yet there are remarkable exceptions to this rule Sputum is typically scanty at first becoming thin and blood stained and containing large numbers of *P. pestis* but sputum may remain negative and may be sticky and mucopurulent Severe abdominal pain may be present the pulse rate may be low and the respiration rate no more than 36-40 The finding of *P. pestis* in sputum or lung puncture material is a sign of bad prognosis

DE SMIDT (p 688) gives instructions on the laboratory diagnosis of plague Material from buboes must be taken from the gland substance not from the surrounding oedematous tissue Staining reactions of pneumococci and Friedlander's bacillus may imitate the bipolar appearance of *P. pestis* but culture easily differentiates these organisms In post mortem material spore bearing organisms may stain with a bipolar effect but are always Gram positive The typical post mortem signs in rats are an enlarged engorged dark friable spleen red serous membranes of dull lustre with petechial or diffuse haemorrhages blood stained fluid in the pericardial pleural and peritoneal sacs enlargement of the suprarenals enlargement and engorgement of the liver sometimes with white milky foci of necrosis enlargement of glands especially in the cervical region

LOBO and SILVETTI (p 305) point out that in plague the bacilli can be isolated in culture from the bone marrow of the second or third phalanx of the human finger though they may not be visible on direct smear In treatment these authors favour plague serum but they have found little value in Argentina from efforts at prophylaxis by means of vaccines or sera

ALVARADO (p 689) referring to the difficulty of post mortem diagnosis of plague in isolated regions remote from medical services advocates the amputation of a finger from the cadaver of any person who has died of an acute illness of less than 10 days duration in an area where plague may be suspected The finger is sent dry to the laboratory where examination of the bone marrow is carried out The author envisages a service similar to the viscerotomy service in the control of yellow fever

PLUM (p 687) reports that in a period of 12 months 547 cases of plague were admitted to two hospitals in Nairobi Kenya At one hospital where most of the cases were pneumonic or septicaemic 127 of 134 patients died at the other hospital where there were few pneumonic or septicaemic cases 227 of 413 patients died In the opinion of the author sulphapyridine if used in sufficiently large and frequent doses acts almost as a specific in the bubonic form of the disease

In a survey of the work of the Haffkine Institute for 1939 SOKHEV (p 300) states that sulphathiazole and sulphapyridine have powerful

curative action which may best be measured when septicaemic plague only is considered. The trials at that time had been relatively few but there was a clear indication of advantage over the standard iodine treatment and even over serum treatment. In mice sulphathiazole appears to be more effective than sulphapyridine.

GIRARD (p 308) has used sulphonamides successfully in the treatment of plague in animals and man. He reports favourably on sulphapyridine and advises daily doses of 6 to 10 gm during the febrile period after the temperature has fallen the drug should be continued in daily dosage of 1 to 2 gm for 12 days. In animals sulphapyridine proved more effective than serum.

DE VILLAFANE LASTRA *et al* (p 309) record an outbreak of plague in the Province of Cordoba of 70 patients with bubonic plague 54 per cent died of 35 with pneumonic disease all died. Treatment with sulphathiazole was given to three subjects with the bubonic form the results were good.

Vaccination Control

In discussing the use of a live vaccine in plague OTTEN (p 309) draws attention to the fact that any vaccine will protect certain animals such as the white rat the mouse and the monkey but that this is not so with the guinea-pig and the house rat. In these two animals the live avirulent vaccine proved its superiority over dead vaccines. The Tjwidej strain originally from a house rat was kept as usual at 5 C in deep serum agar stab culture and in four months had entirely lost its virulence. Passage through rats failed to re-establish virulence. More important however was the fact that this strain possessed high immunizing power for susceptible animals. Avirulent strains are variants by dissociation but the form of the colony gives no indication of the loss of virulence. The change is apparently irreversible but single colony isolation is essential for certainty. Avirulent strains other than Tjwidej have been isolated and some are particularly effective in rats others (such as the E V strain) in guinea-pigs. Otten considers that man behaves like the house rat rather than like the guinea-pig in regard to immunization and in man he claims that the results achieved with live vaccine have demonstrated its great advantage over killed vaccine. He gives figures which show the great reduction in mortality in the vaccinated as compared with unvaccinated controls.

PIRIE and GRASSET (p 311) report that two South African avirulent strains of *P. pestis* are about equal to the Tjwidej strain in immunizing power for rats and that the E V strain is rather less potent [see Otten above who states that the E V strain is more effective in guinea-pigs].

GRASSET (pp 311-312) uses a mixture of the Tjwidej and E V strains since it is not definitely known what is the human response to each of these two immunological types. No sign of reversion to original virulence has been seen but the danger is that the strains may lose immunizing power. In man local reactions to inoculation are not great and the temperature usually remains normal.

GIRARD (p 763) holds that not every avirulent strain of *P. pestis* will make an efficacious vaccine and claims that three characters are essential—(1) Normal growth especially in broth. (2) Persistence of some degree of virulence enough to cause local nodule formation in

[July 1943]

guinea pigs injected with 1 000-2 000 million organisms (3) Persis-
tence of some toxicity so that filtered extracts after the cultures have
been frozen and thawed (technique of Gory and Grasset) will kill mice
in 8-36 hours after injected doses of 1/20 to 1/4 cc

In the Annual Report on Plague in Java for 1939 (p. 332) it is
recorded that by the end of that year over 14 million houses had been
improved (that is had been so altered that rat harbourage was reduced)
and that almost one million new buildings approved anti-rat
devices had been erected. The number of cases of plague had fallen
by about one-quarter of the number seen in the previous year. This
fall seems probably to have been due to the increased use of the live
Ottens vaccine for primary inoculation and to the late appearance
million injections have now been given.

of the rainy season in the year under discussion.
DONOVAN and HOPKINS (p. 317) describe the use of the flame-thrower
for killing rats and fleas. This can be used not only for burrows but
also for killing rats and fleas and other insects in cracks and crevices of
walls and indeed for the control of any insect which passes part of its
life in the walls or floors of houses. It has a use therefore in typhus
Chagas disease and relapsing fever.

Charles Wilcocks

MALARIA

LI 14 (Firmiano de Oliveira) & DOS SANTOS (Israel Alencar) Quatro casos
autoctones de malaría quarta no município de Itaporã a
Estado de São Paulo. Four Autochthonous Cases of Quartan
Malaria in Itaporã in the State of São Paulo. — *Arquivos de*
Higiene e Saúde Pública São Paulo 1942. Vol. 7. No. 15.
pp. 113-119. With 4 figs on 1 plate. English summary (4 lines).

Quartan malaria has rarely been reported from the south of Brazil
a fact which endows it with interest for the State of São Paulo. All
four patients were inhabitants of the State of São Paulo. The malarial
episodes were typical of *P. malariae* a diagnosis which is supported
by the microphotographs published. One of the four patients had a
typical quartan fever.

Norman H. Hille

LAVRENKO (E. M.) Morphological Differences in the Larvae of
Subspecies of *Anopheles maculipennis* L.—*Med. Parasit. & Parasitol.*
Moscow 1942. Vol. 11. No. 3. pp. 30-39. With 10 figs.
[In Russian]

The author describes a method for the identification of races of
Anopheles maculipennis based on the chaetotaxy of the abdominal
segments in the larvae and especially on the area number of
branches in the hairs. The differential characters—dealt with in

detail and illustrated—are set forth in the accompanying table in which the numerals for the hairs are those used in Martini's scheme —

Average Number of Branches in Hairs of the Abdominal Segments in Larvae of Races of A. maculipennis

Hair Numeral	Number of Abdominal Segment	Races of Larvae		
		<i>atroparvus</i>	<i>typicus</i>	<i>mesasiatica</i>
1	I	9	10	11
	II	13	16	12
	III	18	18	19
	IV	18	19	19
	V	18	18	18
	VI	17	18	18
	VII	16	18	18
2	I	6	7	8
	II	8	9	10
	III	7.5	7.5	9
	IV	3	4	5
	V	2.5	3.5	5
	VI	1	1	1
	VII	5.5	6	7
3	I	1	1	1.5
	II	5.5	5.5	6.5
	III	4.5	4.5	5.5
	IV	5	4.5	5
	V	4	4	5
	VI	3.5	5	6
	VII	3	3	3.5
4	I	6	6.5	7
	II	1	1	1
	III	1	1	1
	IV	3	3	3
	V	1	1.5	1
	VI	1	1	1
	VII	1	1	1
5	I	6	6	7
	II	9	9	11
	III	10	9	10.5
	IV	7	7	8
	V	7.5	7	7
	VI	7.5	7	8
	VII	7	7	8

C. 4 Hoare

BEKLEMISHEV (W. N.) [Comparative Study of Life Histories of Blood Sucking Arthropods]—*Med. Parasit. & Parasitic Dis.* Moscow 1942 Vol 11 No 3 pp 39-44 [13 refs.] [In Russian.]

The author gives an outline of comparative ecology and parasitology of some blood sucking insects based mainly on researches carried out by the Entomological Department of the Central Institute of Malaria Moscow.

The life history of *Anopheles maculipennis* was investigated in greatest detail and served as a model for the study of the bionomics of other haematophagous insects.

Owing to its obligatory haematophagy and predatory habits the female *A. maculipennis* concentrates from distant places for attacks on large gregarious mammals while ignoring individual small mammals dispersed in the same locality. At the same time this mosquito scatters widely in search of suitable water collections for oviposition. In connexion with these habits this species is highly mobile and has a wide range of flight. The exposed life led by its larvae involves a high mortality rate among them but this is compensated by a high fertility rate of the female. However in accordance with its mobile habits the female does not lay all the eggs simultaneously in a single large batch but repeatedly and in small batches. The adult females also run many risks in their long flights in search of food and their death rate is therefore high. On the other hand a single blood meal ensures the complete development of at least one batch of eggs. The life history of these mosquitoes being characterized by gonotrophic harmony and by a repetition of the gonotrophic cycles is well adapted to their ecology. These cycles constitute a gonotrophic rhythm covering the entire imago period of existence of the female and governing all its vital functions.

The life-history of *A. maculipennis* is compared with that of *A. bifurcatus*, Aedes sandflies, horse-flies, Stomoxys, Musca latipara (blood licker) and tsetse flies which are dealt with briefly.

C. A. HOARE

COCHRANE (E.) Notes on *A. gambia* and *A. pseudopictipes* in Grenada—C. b. a. Med. J. 1941 Vol. 4 No. 3 pp. 97-100

BRITISH GUIANA. REPORT OF THE DIRECTOR OF MEDICAL SERVICES FOR THE YEAR 1941 [PEARCE (A. H. B.) Director (Acting)] Appendix III pp. 10-14 Summary of the Work of the Malaria Research Unit for the Year 1941 BEVIER (George)]

British Guiana has an average annual rainfall of about 90 inches in the coastal region. There was a relative drought from September 1938 to June 1941. Deficits of rainfall amounted to 5.7 inches in the last four months of 1938, 24.8 inches in 1939, 21.6 inches in 1940 and 21.9 during the first five months of 1941. Thereafter each month of 1941 except December had rainfall in excess of the 60 year average.

During 1940 the prevalence of *A. darlingi* (the only important malaria vector) diminished in a remarkable manner. Only 76 larvae were captured during the last nine months of that year in the coastal region. 46 of these came from the east bank of the Demerara. Adult *A. darlingi* disappeared at the same rate but several weeks later only four specimens were taken during the last three months of the year. In June 1941 some weeks after the heavy rain started *A. darlingi* reappeared. 153 adults were captured at Lushan and 196 more during the next six weeks. Elsewhere they were not numerous. Of the 1634 adults captured during the year 1334 were taken in Lushan. All but four specimens came from a small area 8 to 12 miles east of Georgetown.

The disappearance and reappearance of *A. darlingi* during and after the drought and the fact that in normal times the distribution of the

species is patchy and with special interest the inquiry now in progress into the conditions favouring the breeding of this species. Larvae have been found in waters with a pH of 4.5-7.3 and a salt content of from 0.028 to 0.126 gm per litre.

Figures denoting parasite and spleen rates and malaria incidence were not available when the report was written. These should be of interest. There had been no severe outbreak of malaria following the reappearance of *A. darlingi*, but it is considered that such an outbreak is likely to occur when *A. darlingi* becomes prevalent once more. Returns from hospitals and dispensaries of the Sugar Producers Association show that the incidence of malaria in 1940 was less than half that of the previous year.

Anopheles other than *A. darlingi* found in this area are *A. tarsimaculatus*, *A. albitalis*, *A. triannulatus* and *A. apicimaculatus*.

Norman White

CORRÊA (Renato R.) & RAMOS (Alberto S.) Os anofelinos da região meridional do Estado de São Paulo [Anophelines of the Southern Region of the State of São Paulo]—*Arquivos de Hig. e Saúde Publica* São Paulo 1942 May Vol 7 No 15 pp 35-57. With 1 map & 11 figs on 5 plates [12 refs] English summary.

A great extension of malaria in the southern part of the State of São Paulo in the early months of 1941 prompted the anopheline survey which is reported in this paper. The area surveyed lies between 23° and 25° S and 48° and 50° W. It contains two topographically distinct regions: an Atlantic coastal area separated by mountains from high uplands. Thirteen of the 38 species of Anopheles that have been reported from Brazil were found during the survey. These were *A. albitalis*, *A. argyritarsis*, *A. darlingi*, *A. osualdoi*, *A. pessoai*, *A. strodei*, *A. triannulatus*, *A. peryassui*, *A. fluminensis*, *A. intermedius*, *A. pseudomaculipes*, *A. lutii*, and *Chagasia fajardo*. *A. strodei* was the most widely distributed; it was specially prevalent at high altitudes. In many places *A. darlingi* was predominant among Anopheles captured in houses. At Ribeira oocysts were found in two of 33 *A. darlingi* dissected. Two of 24 *A. osualdoi* var *metcalfei* (*tarsimaculatus* Root) dissected were found infected. Good illustrations depict the characteristics of the eggs of *A. strodei*, *A. darlingi*, and of *A. osualdoi* larval characteristics of *A. osualdoi* and the terminalia of *A. fluminensis*.

Norman White

CORRÊA (Renato R.) & RAMOS (Alberto S.) Relatório das investigações entomológicas realizadas na represa de Light e ao longo da E.F. Sorocabana Ramal Mayrink Santos [Entomological Investigations between São Paulo and Santos]—*Arquivos de Hig. e Saúde Publica* São Paulo 1942 May Vol 7 No 15 pp 311-333. With 1 folding map & 12 figs on 4 plates.

This is a record of an anopheline survey carried out in and around the impounded waters in the Light and Power Company's Reservation near the sources of the Rio Grande, Rio das Pedras and Rio Perequê between São Paulo and Santos. Collections were made of anopheline larvae and adults. The number of adults captured was small; this

fact is ascribed to the relatively low temperatures prevailing—the survey was carried out between July 21st and September 19th. Larvae identified were 4 *strodesi* 1513 4 *albitalarsis* 1188 4 *falsiparum* 11 4 *arabitararsis* 1 *A. darlini* 13 *A. cruzi* 3 and 4 *persooni* 7. The 1st adults captured included 4 *strodesi* 21 *A. albitalarsis* 78 4 *pseudomaculipes* 16 4 *cruzi* 8 and 4 *lut* 2. The scarcity of 4 *darlini* was apparently seasonal—this species was said to have been very prevalent in this area in the early months of 1940 and 1941. 4 *cruzi* larvae were found in water at the base of leaves of bromeliads which extensively parasitize trees in the area. [In Trinidad 4 *bellator* breeds exclusively in this collection of water see this Bulletin 194^o Vol 39 p 664] *No man White*

RACHOL (Rene Guimaraes) *Relatorio sobre o recenseamento realizado na represa Rio Grande* [Examination of the Population at the Reservoirs of the Rio Grande]—4 *quintos de H. e Saude Publica* Sao Paulo 194^o May Vol 7 No 15 pp 241-250 With 1 map

Simultaneously with the anopheline survey carried out by CORREA and RAUOS at and around the hydro-electric power source of the Rio Grande (see above) the author carried out a survey of the resident human population. He visited 234 houses and saw 799 individuals mostly belonging to the Light and Power Company but some to the Telephone Company. The inspection included the examination of 1598 blood meals. Only 91 of the 98 persons examined were found to harbour malaria parasites 17 of these *P. vivax* 4 *P. falciparum*. Twenty seven per cent of the persons examined gave a history of past malaria—one third of these had suffered from clinical malaria believed to have been contracted locally during the year in which the survey was carried out. *No man White*

UNTE (Ovidio) & RAUOS (Alberto S.) *Anofelismo das alturas no Brasil meridional* [Anophelines of High Altitudes in Southern Brazil]—4 *quintos de H. e Saude Publica* Sao Paulo 194^o May Vol 7 No 15 pp 89-106 39 ref.] English summary

The paper is prefaced with summarized information concerning the reported prevalence of many species of Anophelinae at very high altitudes in many countries of Asia Africa and Central and South America. Comparable information concerning the anopheline fauna of high altitudes of Brazil not being available the authors have started to make good the deficiency. Their studies were carried out in the mountain ranges of Mantiqueira and Mar and the off shoots in the States of Sao Paulo and Minas Geraes. There does not appear to be any endemic malaria at present in any of these high regions. *A. lanei* was found breeding at a place 1570 metres above sea level in company with 4 *strodesi* 4 *lut* 4 *parvus* and 4 *arabitararsis*. *A. arabitararsis* *A. albitalarsis* *A. strodesi* *A. luteipes* *A. parvus* and *A. cruzi* were found in many localities at heights ranging from sea level to 2000 metres. *A. dalessi* was found up to 1000 metres but not higher. *A. maculipes* had a similar distribution. Of all anophelines 4 *strodesi* was most in evidence everywhere. Eggs of a variety of *A. oswaldoi* were found at 1100 metre. *No man White*

- UNTI (Ovidio) Notas ecologicas sobre anofelinos do Vale do Paraíba [Ecological Notes on the Anophelines of the Paraíba Valley]—*Arquivos de Hig e Saude Publica* Sao Paulo 1942 May Vol 7 No 15 pp 11-21 With 1 map English summary

The Malaria Prevention Service of the State of Sao Paulo has installed at Guaratingueta in the Paraíba Valley an experimental station whose main function it will be to study the phenomenon of anophelism without malaria. As a first contribution to this study the author reports the pH and chlorine content of the waters in which larvae of *A. albiparvus*, *A. strodei* and *A. argyritarsis* were found. The chloride content expressed in terms of chlorine of these breeding places was low ranging from 0.00301 to 0.0458 per thousand parts. In waters in which no larvae were found the proportions were from 0.009115 to 0.0466 per 1000 parts, hardly significant differences. The pH of the water in all but two of the breeding places was between 6.0 and 6.8. In two it was 7.0. The most important breeding places are lagoons on both banks of the river from 20 to 100 metres in circumference with water of a maximum depth of 50 cm and with exuberant aquatic vegetation.

Norman White

- UNTI (Ovidio) O pH dos solos e dos focos de *Anopheles* e a epidemiologia da malaria no Brasil [The pH of Soils and of *Anopheles* Breeding Places and the Epidemiology of Malaria in Brazil]—*Arquivos de Hig e Saude Publica* Sao Paulo 1942 May Vol 7 No 15 pp 121-158 With 1 map [35 refs] English summary

This is a record of the results of the determination of the pH of some 3000 samples of soils and water in areas in the States of Sao Paulo, Minas Geraes and Rio de Janeiro in which *Anopheles* abound. In some of these areas malaria is hyperendemic in others malaria is absent in spite of the presence of anophelines. The geological formation of the different areas is briefly described—there is a geological map of the State of Sao Paulo and the anopheline fauna of the different localities is detailed. A summary of such a mass of information is not possible. This is a matter of small moment because it does not appear that pH explains any of the vagaries of anopheline and malaria distribution in Brazil. All the *Anopheles* species whether vectors or not can breed in waters with a pH ranging from 6.2 to 7.5. Certain species display preferences: a pH of 6.0 to 6.6 is favoured by *A. albiparvus* and *A. osuadori*; 5.6 to 7.0 by *A. argyritarsis* while *A. darlingi*, a potent vector, has a marked preference for neutral or slightly alkaline water. *A. strodei* seems to have no preferences in this matter. In the malaria free Paraíba Valley pH findings geological conditions and the anopheline fauna can all be matched in some notoriously bad malarial regions.

Norman White

- FONSECA (J. A. B.) Considerações sobre a *Anopheles* (*Anopheles*) *eiseni* Coquillett 1902 como transmissor da malaria humana [Anopheline *eiseni* as a Vector of Human Malaria]—*Arquivos de Hig e Saude Publica* Sao Paulo 1942 May Vol 7 No 15 pp 73-87 With 5 figs on 3 plates

The author describes the successful laboratory infection of *A. eiseni* with *Plasmodium falciparum*. In the majority of the experiments the mosquitoes were kept at laboratory temperature which varied from

18 to 25 C. Among these oocysts were found. The lot of mosquitoes in which sporozoites in the salivary gland were found were kept at a temperature of 25 to 27. The gland infection was noted on the 11th day after the infecting feed. *Anopheles* showed a slight preference for the blood of the tico-tico [a small Brazilian bird resembling the sparrow] and of man as compared with that of the horse guinea pig, cattle and fowl but it is not an avid blood sucker of any of these animals. For this reason it is unlikely to be an important vector of malaria though it might act in that capacity on occasion. Norman White

DA FONSECA (Flavio) & CORRÊA (Renato R.) Infecção experimental de *Anopheles (kertes ia) cruzi* pelo *Plasmodium vivax* [Experimental infection of *Anopheles cruzi* with *Plasmodium vivax*].—*Mem Inst Butantan* 1941 Vol 15 pp 91-98 With 2 figs on 1 plate. English summary

Anopheles (kertes ia) cruzi has long been suspected as a potential vector of malaria but proof is lacking. Laboratory bred *A. cruzi* derived from eggs laid by wild mosquitoes caught on the Ilha de Santo Amaro in the State of São Paulo were fed on patients whose peripheral blood contained *P. vivax* gametocytes. Twenty nine such mosquitoes were subsequently dissected. One stomach and one salivary gland infection were found 5 days and 18 days respectively after the infecting feed. Norman White

ECKSTEIN (A.) Störungen der Ernährung, des Stoffwechsel und der Verdauungsorgane bei der Malaria des Kindes [Disorders of Nutrition Metabolism and the Alimentary Tract in the Malaria of Children].—*Ann Paediat* 1942 July Vol 159 No 1 pp 25-36 With 7 figs

The younger the child the less characteristic are the manifestations of malaria. The author writing from Ankara describes the following types of disorders in children infected with malaria.

(1) Symptoms almost negligible but slight splenic enlargement fever and anaemia may be detected by close observation.

(2) Dyspeptic with failure to gain weight stunting of growth and anaemia. In older children delayed puberty and infantilism may be the chief features.

(3) Intestinal with dyspepsia and enteritis.

(4) Oligodysenteric or dysenteric types with (a) toxicosis (chiefly in infants) (b) biliary symptoms (c) typhoid like symptoms (d) concomitant typhoid which has built up an existing malaria infection.

(5) Acute abdominal simulating gastritis appendicitis or peritonitis. The sudden onset of acute abdominal pain with rigidity and high fever often suggests the need for immediate operation unless a thorough search is made for parasites.

(6) Nephritic with pronounced oedema and albuminuria. This is most frequent in quartan malaria but the only case seen by the author in the present series was due to malignant tertian infection.

(7) Cirrhotic (liver). The author and his colleague have seen no less than 103 cases of malarial cirrhosis of the liver in children. Of these 14 were in children between the ages of two and five years and 35 in children of six to ten years old. No description is given of the

type of the disease or of its symptoms but the association with malaria is said to be undoubted. Treatment was unsatisfactory and all that could be done was to relieve ascites by tapping.

(8) *Disturbance of the carbohydrate metabolism* The blood sugar was greatly increased in two of the sixteen cases of malignant tertian infection in which this point was investigated. There was no sugar in the urine in any of the cases.

In congenital and infantile malaria the manifestations are especially likely to be aberrant and to give rise to errors in diagnosis.

John W. D. Megaw

ECKSTEIN (A) *Malaria und Zentralnervensystem im Kindesalter* [The Central Nervous System in the Malaria of Children]—*Ann Paediatrici* 1942 Vol 158 No 2/3 pp 65-96

The disorders of the nervous system in the malaria of children were found by the author to belong to the following types. Except when otherwise stated the infections were malignant tertian.

(1) *Pre comatose* sudden severe headache may be the only manifestation of the disease usually there are also splenic enlargement and fever. In one of the two cases described no parasites were found on the first day of observation but numbers of rings were found on the next day.

(2) *Comatose* (a) *With Insidious Onset* after several days of fever. In one of the two cases described the pressure of the cerebrospinal fluid was greatly increased rapid improvement followed intramuscular injections of quinine. The other patient died a few hours after intravenous and intramuscular injections of quinine. (b) *With Sudden Onset* (the sunstroke type) In this type the onset was with high fever and convulsions. Two cases are described in both there was increased pressure of the cerebrospinal fluid which also showed an increase in the cell count and the sugar content. Both of the patients recovered after intramuscular quinine. (c) *Meningitic type* simulating tuberculous or cerebrospinal meningitis. In all the four cases investigated the cell count and sugar content of the cerebrospinal fluid were increased and the pressure of the fluid was increased in three. In one of the cases no parasites were found in the blood on the eighth day but numerous rings were found on the following day this patient died in spite of intramuscular and intravenous quinine but the other three recovered with the same treatment. (d) *Encephalo Meningitic type* Signs of encephalitis usually appeared after those of meningitis but in two out of seven cases they preponderated from the outset. In the two cases described no parasites were found on the first examination but numerous rings were seen on the next day. One of the patients died rather more than twenty four hours after the first injection of quinine the other recovered. In both the cerebrospinal fluid showed increases in the pressure cell count and sugar content but the blood sugar was low. (e) *Epileptic type* becoming comatose. One case is described in which a girl of eight years had a history of unaccountable deterioration in behaviour for fifteen days then suddenly she had a severe epileptic seizure followed by frequent fits and then a frank status epilepticus. There was a prompt response to intramuscular atabrin.

(3) *Neuritic* In one of the three cases described the parasites were benign tertian. The neuritic manifestations were varied in type.

(4) *Hemiplegic*—A child of two years suddenly developed convulsion with paralysis of the left arm and leg. Infantile paralysis was suspected and on the first examination no parasites were found but the fever was tertian in type and after repeated searches benign tertian parasites were found and a complete cure followed a course of atabrin—there was no evidence of paralysis four weeks later.

(5) *Neuropathic*—In four cases of children ranging from three to eleven years old the chief manifestations were unexplained changes in disposition (nervousness, temperamental deterioration, hysterical outbursts, etc.). In one of these the parasites were benign tertian.

(6) *Psychotic*—with delirium or manic-depressive symptoms.

The great importance of repeated blood examinations is stressed if serious mistakes in diagnosis are to be avoided. *John W. D. Meade*.

WINGFIELD (Alec) Treatment of Malaria in England—*Brit. Med. J.* 1943 Apr 17 pp 476-477.

During 18 months 60 patients suffering from malaria were admitted to the Seamen's Hospital, London. 57 were *P. falciparum*; 2 *P. vivax* and 1 *P. malariae* infections. Most of the *P. falciparum* infections were contracted in Sierra Leone. All the patients were restored to health. As is usual in such a series of patients many of whom had been or were taking quinine the symptoms were many and varied and often but little indicative of the malarial nature of the disease. The treatment adopted in most of these cases was very thorough: first week, mepracrine (atabrin) 0.1 gm. thrice daily and quinine 5 grains twice a day; second week, quinine 5 grains twice a day; third week, the first week's treatment repeated. If crescents were present in the blood after the termination of this course primaquine [plasmoquine] 0.01 gm. thrice daily was given for from three to five days. All patients received adequate doses of iron. In the few patients seriously ill on admission, including one of cerebral malaria, unconscious with high fever, quinine was given intramuscularly with dramatic results; it was never necessary to give more than 10 such injections. Parasites were found in 42 patients on the first examination; in 13 on the second examination. In 10 patients parasites were only found after the subcutaneous injection of adrenalin. No prolonged follow-up of these patients was possible—the average stay in hospital was 27 days. *Norman Whit*.

CARMAN (J. A.) The Treatment of Malaria with Special Reference to Recent Literature—*East African Med. J.* 1943 Jan Vol 20 No 1 pp 4-14.

This is a critical review of some of the papers already reviewed by WHITE [this *Bulletin* 1942 Vol 39 p 801]. The author's views are in general agreement with those expressed by HILL in that review; he has seen little evidence of toxicity of mepracrine. *C. H.*

CODA (David) Observações referentes a quimioprofilaxia da malária (método de Ph. Decourt) (A contribuição) [Observations on the Chemioprophylaxis of Malaria (Decourt's Method)]—*4 q. t. os de Higi. e Sa. de P. M. a S. o Paulo* 1942 May Vol 7 No 15 pp 159-221 (12 refs). English summary.

The author describes his experience in the suppressive treatment of malaria on the lines advocated by Ph. DECOURT in several publications.

[A summary of one of these papers in this *Bulletin* 1939 Vol 36 p 498 describes briefly what Decourt implies by the dysgonic action of antimalaria drugs quinacrine in particular and the method of treatment he employed with success]

In a malarial locality in Brazil more than 7 000 malaria patients were treated in a variety of ways. Brief clinical notes and protocols of treatment of each of 54 patients suffering from either *P. mear* or *P. falciparum* malaria are published. The cost of treatment is recorded in each case. The clinical attack was brought under control in different ways. Thereafter each of these 54 patients received atebirin 0.30 gm and plasmoquine 0.02 gm once a week in some cases twice a month in others. Most of the subjects had received this suppressive treatment and been under observation for about six months. The number of chemoprophylactic doses varied from 32 to 4 average 15. The results were as follows: 37 patients were free from parasites in their blood throughout; 15 patients parasites were found on one or more occasions but they showed no clinical signs of malaria and 54 patients suffered from a clinical relapse. The author claims that this treatment prevents relapses is therefore economical, is free from danger and by suppressing fever without destroying parasites allows the development of a state of premunition.

Vorman White

MAROVICH (N. Ya.) Essais de lutte contre l'insecte aile de l'*Anopheles maculipennis* au nord [Control of *Anopheles maculipennis* in N. Russia]—*Med. Parasit. & Parasitic Dis.* Moscow 1940 Vol 9 No 6 pp 604-608. With 3 graphs. [In Russian] [Summary taken from *Re. Applied Entom.* Ser B 1943 Mar Vol 31 Pt 3 p 55]

In the summer of 1939 experiments on the control of adults of *Anopheles maculipennis* Mg. in buildings were carried out in a group of villages on a river in the Province of Archangel. The usual type of dwelling there consists of a high log house joined by a passage to a large cow house over which is a hay loft some 16 ft high and adjoining separate closed or open sheds some 23 ft high. In summer the inhabitants usually sleep in the passage and the loft. The mosquitoes began to leave their hibernation quarters on 18th-19th May and to oviposit on 25th-28th May and first generation adults first emerged on 22nd June. Females with a developed fat body were abundant in early August. The mosquitoes concentrated in the cow houses and hardly any were observed in the living rooms or passages. Owing to the height of the sheds and lofts the numbers of mosquitoes in them could not be estimated but those caught constituted 2-164 and 2-73 per cent respectively of the total catch. The mosquitoes were collected by hand in the living rooms and passages but the cow houses were sprayed with a 3 per cent solution of soft soap with the addition in some cases of raw alcohol (2 per cent) which considerably increased the effectiveness of the spray. In all 18 applications were made between 7th June and 25th August at intervals of 5 or 6 days. The 2-3 hours after spraying showed that in most cases some of the mosquitoes survived and the proportion that did so increased as the cow houses were larger and darker and had more recesses and corners.

A comparison with neighbouring untreated villages however indicated that even partial treatment of infested buildings results in a reduction in the numbers of mosquitos and this was particularly evident during the period preceding the emergence of the first generation. Examination of the ampullae of the oviducts of active females showed that the numbers of older individuals taken were twice as great in untreated as in treated villages.

SHLENKOVA (M. F.) Quelques deductions pratiques de l'experience de lutte contre les moustiques dans les exploitations de tourbe d'Ozeretzkoie [Control of *A. maculipennis* in Peat Bogs in the Moscow Province]—*Med. Parasit. & Parasitic Dis.* Moscow 1940 Vol 9 No 6 pp 609-614 With 3 figs. [In Russian] [Summary taken from *Rev. Applied Entom.* Ser. B 1943 Mar Vol 31 Pt 3 pp 55-56.]

In the course of an anti malaria campaign in a peat bog district in the Province of Moscow it was found that if dusting against the larvae of *Anopheles maculipennis* Mg. is stopped too early in the autumn there is a considerable increase in the numbers of the overwintering adults which renders work in spring more difficult. Thus in 1934 the larvicide was last applied on 15th September after which the adults did not appear in any considerable numbers but in 1935 the last application was on 13th August and many mosquitos emerged in autumn three times as many adults emerged from hibernation in the spring of 1936 as in that of 1935. The systematic destruction in spring of females in cow houses which are their chief day time shelters considerably reduces the number that complete digestion and thus the number of eggs laid. The examination of breeding places near a village in which the adults were systematically destroyed and near a control village showed that the numbers of larvae caught per dip within a radius of 100 yards averaged 14 and 124 respectively; no larvae were taken outside that radius round the treated village whereas they were taken at distances of up to 2½ miles round the untreated one. In both cases the larvae became scarcer as the distance from the village increased.

Previous observations had shown that in this district men were seldom attacked in the open but mosquitos were very active at night out of doors in the summer of 1936 when owing to unusually hot weather most of the women slept in the open. Whereas in 1934-35 only 5-6 per cent of the mosquitos caught in traps when entering the huts contained blood in 1936 the percentage was 12.2 in mid June, 51.7 during the last ten days of July and 19.5 in mid August this curve coinciding with the rise in temperature. Examination showed that the mosquitos caught entering buildings in the evening and the first half of the night chiefly consisted of unfed individuals whereas those containing blood entered in the early morning before sunrise. This indicated that the mosquitos used the huts and cow houses on hot days only as shelters in which to digest their blood meal. Of the engorged females trapped in 1936 when entering the huts 59 per cent contained human blood in June, 92.2 in July and 61.5 in August and the corresponding percentages for those trapped in cow houses were 6.8, 15 and 14.2. It appears therefore that there was no increase in the incidence of attack on cattle and that the increased attack on man was due to a change in the habits of the population.

It is concluded that *A. maculipennis* is primarily attracted to men at night wherever they may be and less by the conditions of temperature and humidity out of doors

The effect of meteorological conditions on the distribution of mosquitos in day time shelters was observed in cow houses in April all the mosquitos occurred on the inner side of the roof of the hay lofts where the temperature was 13 C [55.4 F] and the relative humidity 67 per cent. In July when the temperature and humidity in the lofts rose to 30.3 C [86.48 F] and 48 per cent respectively they were observed in the lower part of the cow houses where the temperature and humidity were 22.7 C [72.86 F] and 59 per cent and concentrated on the walls in dark corners

PRENDEL (A. R.) Essais de contrôle de certaines méthodes de désinsection des abris diurnes des moustiques [Disinsection of Day-Time Shelters of Mosquitoes]—*Med. Parasit. & Parasitic Dis.* Moscow 1940 Vol 9 No 6 pp 637-648 [In Russian] [Summary taken from *Rev. Applied Entom.* Ser. B 1943 Mar Vol 31 Pt 3 pp 56-57]

Insecticides that could be applied against mosquitos in their day time shelters were tested in Odessa in large muslin cages containing 50-100 examples of *Anopheles maculipennis* Mg, *Aedes caspius* Pall and *Culex pipiens* L. Mosquitos that fell to the ground were counted as dead since experience has shown that such individuals never survive. The easiest to prepare and apply and the cheapest were emulsions containing 1 per cent soft soap and 1 per cent formalin or 1 per cent hard soap and 2 per cent crude alcohol which gave complete mortality of the mosquitos and are recommended for treatment of cow houses etc. but produce too much humidity for use in dwelling houses. Higher concentrations (2-3 per cent soap) were less effective as it was impossible to obtain a sufficiently fine dispersion. Other insecticides that gave 100 per cent mortality included pyrethrum dust alone or mixed with an equal amount of wood ash which is recommended for living rooms a cheaper dust prepared from pyrethrum residue which required a higher rate of application a dust of 15 per cent anabasine sulphate a spray prepared by steeping pyrethrum residue for 10 days in benzine and one containing 1 per cent soap and 0.1 per cent anabasine sulphate

AFANASSIEV (S. I.) Contribution to the Question of the Use of the Distillate from Coke Stills against Mosquito Larvae—*Med. Parasit. & Parasitic Dis.* Moscow 1941 Vol 10 No 2 pp 287-290 [In Russian] [Summary taken from *Rev. Applied Entom.* Ser. B 1943 Mar Vol 31 Pt 3 pp 59-60]

Investigations on the use against Anopheline larvae of a distillate from coke stills were continued in the northern Caucasus in 1939 when over 16,000 sq yards of water was treated. It formed an elastic film that withstood slight rain and wind with a velocity of about 5 miles per hour and killed most of the larvae and pupae in an hour. If the film was not broken by strong wind or rain the water remained free from eggs or larvae for up to 9 days. A table shows the rates of application required at different temperatures and in the presence of different amounts of aquatic vegetation. Applied in an aquarium with dense submerged vegetation at a dosage ten times as high as that

normally used for treating infested waters the distillate was not harmful to *Gambusia*. When in glass jars the fish succumbed in 2 days in the presence of an unbroken film of the distillate on the water. Slowly flowing water in a ditch 40 ins wide was effectively treated by allowing the distillate to drip from a muslin wick and filling the entire width of the ditch a little lower down with leafy branches to make the liquid spread. It was applied at the rate of 180 drops a minute the whole of the surface of the water was covered with a thin film in 15 minutes and the film was maintained for 44 hours.

The specific gravity of the distillate used does not exceed 0.925 at 15°C [59°F] its flash point is not above 35°C [95°F] it begins to boil at a temperature of not more than 138°C [280.4°F] and its viscosity at 50° Engler does not exceed 1.60. Samples characterised by somewhat lower indices than these maxima were the best larvicides [See this *Bulletin* 1939 Vol 36 p 788].

SHANNON (R. C.) Brief History of *Anopheles gambiae* in Brazil — *Caribbea: Med J* 1942 Vol 4 No 4 pp 123-128

This short account of the invasion of Brazil by *A. gambiae* is full of interest. Shannon discovered the larvae in 1930 and within a short time an intense epidemic of malaria struck the suburban section of Natal. The parasite rate of the *A. gambiae* reached the fantastic figure of 63 per cent with a sporozoite rate of 30 per cent. The mosquito extended its breeding grounds during the succeeding rainy seasons and by 1938 had reached the populous regions of the Assu Mossoro and Jaguaribe valleys. 14,000 deaths from malaria were reported during 1938 and 1939. In 1939 a campaign of eradication was commenced the last specimen was found 19 months later in September 1940 and it now seems that the difficult feat of complete extermination has been achieved.

Success depended on five factors:—(1) The unfavourable topography and climate of the invaded region so that in the dry seasons the breeding places were greatly reduced. (2) The presence of an organization capable of coping with the problem namely the Yellow Fever Control Service of Brazil. (3) The peculiarities of the biology of the mosquito—the eggs do not withstand desiccation they are deposited to a large extent in man-made open small pools relatively easy of detection the adults are strongly domestic in habit. (4) The possession of two powerful weapons in Paris green and insecticidal sprays. (5) The failure of *A. gambiae* to escape from N.E. Brazil to the wetter regions all transport conveyances leaving the infected zone were examined and sprayed. [This is a succinct account of a great achievement.] C. H.

BLACKWATER FEVER.

CREAGH (E. P. N.) Notes on Four Cases of Blackwater Fever occurring in Southern Nigeria — *Jl Roy Army Med Corps* 1943 Feb Vol. 60 No 2 pp 64-72. With 3 charts.

The first patient had lived in Africa for 17 years and had had blackwater fever in 1936. His last obvious attack of malaria was in December 1940 but in November 1941 he was admitted to hospital stating that he had passed black urine a few hours previously.

Haemolysis was massive and despite treatment with fluids alkalis and blood transfusion he became anuric and died on the sixth day with uraemic manifestations.

The second patient had spent about 6 years in Africa and had had various attacks of malaria. He took daily quinine regularly. He had felt unwell for ten days before admission to hospital in March 1942. No parasites were found in his blood but he was given 10 grains of quinine thrice during the day and on the following day developed blackwater fever. The haemolysis was considerable but the urinary output remained good. Treatment was along the usual lines and included small slow blood transfusions. He was also given liver extract. The blood count continued to fall for some days after the urine had cleared and during convalescence he had several carbuncles. Malaria parasites were found on the 33rd day but they rapidly disappeared under the action of quinacrine [mepacrine] [atebrin] without further blackwater fever occurring.

The third patient had also been many years in Africa where he had had much malaria and one attack of blackwater fever ten years ago. Before the present attack he had felt unwell for a week but no parasites had been found. He was slightly icteric and was thought to be suffering from infective hepatitis but in view of his history he was given quinacrine 0.1 gm t.i.d. and quinine grains v b.i.d. On the evening of the second day of treatment the quinine was discontinued and in the afternoon of the fourth day he passed urine containing haemoglobin. The urine cleared after twenty four hours and there was no evidence of renal inadequacy. Malaria parasites appeared during convalescence on the 27th day and the patient was treated with quinacrine no further blackwater occurring.

The fourth patient had been in Africa 13 months and had had fever once. He took quinine grains v daily. He had felt ill for five days and then observed that his urine was black. The attack was relatively mild and the urine cleared in 24 hours although there were two short relapses before it remained clear.

F Murgatroyd

SMITH (Felix) & EVANS (R Winston) Effect of the pH of the Blood on Haemolysis with Special Reference to Blackwater Fever — *Brit Med J* 1943 Mar 6 pp 279-282

The authors found that owing to changes in the pH of the blood the fragility of the red cells in both normal and malarial subjects varies considerably during the 24 hours. They claim that at the onset of blackwater fever there is an increased fragility due in part to a lowering of the pH of the blood and that the haemolysis can be arrested by giving large doses of alkalis e.g. sod bicarb and sod citras aa grs vix by mouth two hourly or 20 cc of a 2M or 3M solution of sod lactate intravenously thrice daily. They remark on the dangers of oedema from excessive fluids given intravenously and they recommend judicious blood transfusions after the early stages of the disease as the most reasonable procedure for sustaining the efficiency of the kidney.

F Murgatroyd

LOUIT (John F) Blood pH and Haemolysis [Correspondence] — *Brit Med J* 1943 Mar 20 pp 360-361

Loutit criticizes the views of SMITH and EVANS [above] on the ground that the effect of increase of pH in increasing red cell resistance to

haemolysis *in vitro* should not be taken dogmatically as indicating the same action *in vivo*. Moreover these authors advocate the cross matching of blood in the ice box but Loutit points out that 75-98 per cent of normal bloods contain auto-agglutinins active at this temperature. He argues that it would be more logical to advise cross matching at 37 C. He quotes good results in two cases of blackwater fever from repeated blood transfusions with concentrated red cell suspensions without reaction. C II

TRYPANOSOMIASIS

FERREIRA (Claudio) Alguns aspectos da tripanosomíase humana no noroeste da Colónia de Moçambique [Sleeping Sickness in North west Mozambique]—*Bol Geral de Med* Bastora 1942 July Sept Ser 24 Nos 7-9 pp 100-109 With 1 map

After general remarks on human trypanosomiasis the clinical symptoms, course of the disease and the vectors of the protozoon the author gives brief notes of nine cases observed by him. All were treated with Bayer 205 followed by tryparsamide except one old woman of 80 who died after receiving 1 gm of the first drug. The others left hospital early and could not be followed up; the remainder went out improved. The article contains a useful outline map showing the areas of distribution of *Glossina* in North west Mozambique. They are widespread over an area bounded by Lake Nyasa on the west, the Rovuma river on the north and the Luchilingo river on the south-east, also over a smaller area triangular in shape to the south including Catur and Madimba and between these two a narrow strip along the shore of Lake Nyasa. H Ha old Scott

JACK (P W) The Life Economy of a Tsetse Fly—*Proc Rhod Sci Assoc* 1942 Vol 39 pp 43-60 [Summary taken from *R & Applied Entom*: Ser B 1943 Feb Vol 31 Pt 2 p 40]

This paper was written to bring together the results of the research work of various investigators on the bionomics of the tsetse fly in such a way as to present a picture of its life-history as a whole exemplified mainly by *Glossina morsitans* Westw. which has been the particular subject of study in Southern Rhodesia.

MURAZ (G) Maladie du sommeil. Nécessité de compléter par la prophylaxie agronomique sa chimioprophylaxie et sa thérapeutique [The Need for Agronomic Measures in the Control of Sleeping Sickness]—*Presse Med* 1943 Jan 30 Vol 51 No 4 pp 41-42 With 2 figs

This article which follows three others by the author in *La Presse Médicale* (No 28, 30 and 32 of May 30th, June 20th and July 4th 1942 not received at the Bureau) records the effect of agricultural anti-tsetse measures together with improved medical treatment on the incidence of human trypanosomiasis in French West Africa.

Before 1939 the control of sleeping sickness had largely depended on periodic medical visits to village populations collected to either for diagnosis and treatment. It often happened that an insufficient

number were present in one area the doctor saw only about 50 to 60 per cent of the inhabitants and at one place only 7 of 500 infected persons were regularly treated. This was corrected later by better administrative help. This failure to obtain direct control of human infection was an additional reason for incorporating agronomic preventive measures in the campaign against sleeping sickness.

The main points of the programme were given in the three articles referred to above. Special sums of money were obtained in 1940-1941 and 1942 for an annual programme of agronomic prophylaxis. All the doctors in charge of special sectors were asked to observe the effect of infection on the incidence of new cases and the author gives the results obtained in six sectors of different colonies of French West Africa as examples to demonstrate the success of the campaign.

The numbers of new cases of sleeping sickness in 1941 are compared with the corresponding numbers in 1940. There was a great reduction in all the sectors. The effect of the agricultural measures (bush clearing followed by cultivation) was especially discernible in North Togoland as medical inspection there thanks to administrative assistance was exceptionally complete. In one place Borgou in this area there were 94 new cases (20.43 per cent) in May 1940 and only 11 (3.09 per cent) in May 1941. In Sector 41 (Macenta Guinea) the figures were compared with those of several villages where chemoprophylaxis and chemotherapy only without agronomic measures were employed. In the latter areas the numbers of new cases had either increased or only slightly decreased.

J. F. Corson

Mazza (Salvador) Consideraciones sobre la enfermedad de Chagas en Bolivia [Chagas Disease in Bolivia]—Reprinted from *Prensa Méd Argentina* 1942 Dec 23 Vol 29 No 51 15 pp

In view of a report by Viana Martins and E. Macedo in *Brasil Médico* of August 15 1942 of their finding infected Triatomidae in Bolivia the author has examined systematically Triatomidae from various parts of the country and here records his findings. The chief of these were that the following species were found infected with *T. cruzi*: *Eutritoma sordida* numerous in dwellings in north and south Yungas in La Paz Department. *E. osvaldoi* one specimen from Sucre Chuquisaca. *T. infestans* in Potosi Department (some 10 localities including Sococha where Martins and Macedo found theirs). Tarija Chuquisaca the town of Cochabamba and La Paz (seven localities). Two other species *Psammolestes coreodes* found in birds' nests in Chuquisaca Department. Azeri Province and *Spiniger domesticus* a non blood sucking Reduviid were not found infected by *S. cruzi* though flagellates of some kind not identified at least not stated were being passed in the faeces of the latter.

H. Harold Scott

Wood (Sherwin F.) The Persistence of *Trypanosoma cruzi* in Dead Cone Nosed Bugs (Hemiptera Reduviidae)—*Amer J Trop Med* 1942 Nov Vol 22 No 6 pp 613-621 With 12 figs on 1 plate

The author found several specimens of Triatomidae to be harbouring *T. cruzi* some time after death of the bugs and he notes 97 instances of detection of crithidia or trypanosomes in apparently dead bugs.

[July 1943]

He next carried out experiments to determine how long after death the flagellates could be found living. Some were examined each day till 15 days after death. Of 270 burrs which had fed on mice experimentally infected 249 were positive in the faeces during this period and 21 were negative. *Trypanosoma protracta* and *T. longipes* were used nymphs and adults. On the 15th day two out of four were still positive. Crithidia were found more often than were trypanosomes.

The body cavities and body fluids of dead insects were also found to contain live forms of *T. cruzi* in some stage. The rodents which harbour *T. cruzi* are all entomophagous and probably can become infected in this way. This habit would account for the maintenance of infection in the burrow under natural conditions.

H. Harold Scott

LENT (Herman) Transm. ore da molest. d. Chagas no Estado d. Rio de Janeiro. — R. printed from Rev. Fl. sense de Med. Rio de Janeiro 1943 Jun 11 6 13 pp. With 1 fig. and map. [3 refs.]

PACHAERIAN (A.) Reservoir Hosts of Chagas Disease in the State of Texas. Natural Infection of Nine-Banded Armadillo (*Dasypus novemcinctus texanensis*) House Mice (*Mus musculus*) Opossum (*Didelphis virginiana*) and Wood Rats (*Neotoma micropus micropus*) with *Trypanosoma macrodonta* in the State of Texas. — Amer. J. Trop. Med. 1942 No. 10 6 pp. 623-631. With 4 figs. [15 refs.]

It is well known that armadillos are reservoir hosts of *T. cruzi* in Brazil and South American countries of Chagas's disease. Chagas has also reported the cat, dog and certain monkeys (*Cercopithecus scureus*) as naturally infected and in California a wood rat *Neotoma fuscipes* macrotis has been reported as a reservoir host.

The present author has proved that *Trypanosoma gerstaeckeri* and *T. heidemannii* are naturally infected in the State of Texas [this Bulletin 1940 Vol. 37 p. 147 1941 Vol. 38 p. 81] and he set out to determine the reservoir hosts in the State and examined their blood collected several mammals in the State and by culture and by venodirect methods. He found the following to be infected in nature: *Dasypus novemcinctus* (nine-banded armadillo), *Didelphis virginiana* (opossum), *Mus musculus* (house mouse) and *Neotoma micropus* (wood rat). Often culture gave positive results although no trypanosomes could be found by direct examination of the blood.

H. Harold Scott

LEISHMANIASIS

- PARROT (L) DOVATIEN (A) & PLANTUREUX (Edm) Sur l'infection naturelle des phlébotomes par la leishmaniose generale de l'homme et du chien en Algerie [Algerian Phlebotomus naturally infected with Generalized Leishmaniasis of Man and Dog]—*Arch Inst Pasteur d'Algerie* 1941 June Vol 19 No 2 pp 209-218 With 1 chart [15 refs]

During the summer of 1940 daily catches of sandflies were made in certain kennels in a suburb of Algiers where dogs known to be suffering from generalized leishmaniasis were housed. In all in the five months June to October 1 142 females were captured. The majority of these belonged to the two species *Phlebotomus perniciosus* and *P. longicuspis* there being only 32 *P. sergenti*, 12 *P. ariasi* and 8 *P. parroti*. Of the captured females 508 were dissected. These comprised 250 *P. perniciosus*, 248 *P. longicuspis*, 7 *P. sergenti* and 3 *P. ariasi*. None of the last two species was found infected but 50 *P. perniciosus* and 40 *P. longicuspis* harboured flagellates of the leptomonas type. In both species the most infections were found in the month of June and it was in this month also that the largest number of sandflies was caught. In most flies the infection was confined to the stomach only or to the stomach and cardia. In a small number it extended to the oesophagus also while in one *P. perniciosus* the proboscis was infected.

With a view to testing the possibility of the passage of infection from parent to offspring 124 gorged females were allowed to lay their eggs. From these 105 *P. perniciosus*, 113 *P. longicuspis* and 21 *P. sergenti* were reared. These were dissected within 24 hours of their emergence but in no case was there any indication of infection though from the dissection of sandflies captured at the same time as those which laid the eggs an infection rate of 12 per cent was to be expected. It would thus appear that infection does not pass here directly from parent to offspring. Furthermore as the females which laid the eggs and died soon after were not removed from the rearing cages the larvae would feed on the decomposing bodies of these females of which presumably 12 per cent were infected. If the larvae had thus acquired a leptomonas infection it was to be expected that the infection would pass to the pupae and the adults. The absence of infection in the adults would seem to indicate that such a method of infection does not occur. The general result of the observations recorded in this paper is that in N Africa both *P. perniciosus* and *P. longicuspis* are to be regarded as vectors of kala azar.

C M Henyon

- MECHIN (R) & GUIGON (G) Un nouveau cas de bouton d'Orient du Tell constantinois. Traitement par la quinaquine locale [Case of Oriental Sore in the Constantine Tell treated with Quinaquine]—*Arch Inst Pasteur d'Algerie* 1941 June Vol 19 No 2 pp 219-220 With 1 plate

The paper describes a case of oriental sore in a man 37 years of age. Though he lived in Constantine he paid frequent visits to El Melia and Grarem where sporadic cases have previously been recorded. There was a lesion on the right side of the nose which caused a redness of the surrounding skin and oedema of the right eyelid. Treatment consisted

of infiltration of the lesion with a solution of quinacrine (atebrin) (0.1 gm. in 2 cc. of distilled water) on three occasions with intervals of 8 and 15 days. The lesion cicatrized completely so that it would appear that the drug recommended for the treatment of this condition by FLARER [this *Bulletin* 1939 Vol 36 p 454] has a definite curative action. The authors hesitate to conclude that complete cure has been obtained in this case since the redness of the skin and the oedema of the eyelid have persisted.

C. M. Wenyon

VOGT (P) Un cas sporadique de bouton d'Orient dans l'Ouest de la Mitidja (Alger) [A Case of Oriental Sore in the West of La Mitidja]—*Arch. Inst. Pasteur d'Algérie* 1941 June Vol 19 No 2 p 221 With 1 plate

This is the record of a case of oriental sore in a child from the village of Marengo in a district of Algeria where repeated observations during the past 20 years have failed to disclose any other case.

C. M. Wenyon

FEVERS OF THE TYPHUS GROUP

POMALES LEBRON (A) & MORALES OTFRO (P) The Proteus X Bacilli and the Weil-Felix Reaction—*Proc. Soc. Experim. Biol. & Med.* 1942 Dec Vol 51 No 3 pp 361-363

In an investigation of the reliability of the Weil-Felix reaction 72 cultures of *Proteus* X organisms were studied. They were obtained from 30 Public Health Laboratories in the U.S.A. All but five were found to be typical in their biological and agglutination reactions. Of the five atypical cultures three were aberrant in their biological reactions but gave typical agglutination responses; another did not form indole and the fifth which was supposed to be *Pr. X19* did not agglutinate with high titre typhus serum though it gave typical biological responses.

With high titre typhus serum 21 of 23 *Pr. X* cultures gave completely negative reactions and only 3 of 14 *Pr. X1* cultures were slightly agglutinated.

The *X* cultures differed in their biological reactions from *X19* and *X2* in not fermenting maltose and salicin and in not producing indole. All the strains acted on gelatin in exactly the same way.

Agglutination reactions were carried out on about 1,000 persons belonging to three groups: (1) normal Americans, (2) normal Porto Ricans and (3) Porto Rican hospital patients. There were from 211 to 414 persons in each group. No cases of suspected typhus were included. For each dilution the figures shown in the table relate to the groups in which the lowest and highest percentages of positive reactions were found. The figures marked with an asterisk refer to the hospital patient group; the other figures are about equally distributed among the other two groups and the author considers that there was no appreciable difference in the proportion of cases whose sera agglutinated the different antigen among the three groups of persons.

The notable features of the results are the large number of sera which agglutinated *Pr. OXA* in the lowest dilution and *Pr. X* even in

dilutions of 1-100 Still more remarkable is the large proportion of positive reactions to *Pr* V19 in all the groups Alcohol treated suspensions were used so that *Pr* V19 is obviously quite unsuitable for testing suspected cases

With *Pr* O\19 supplied by the National Institute of Health (U S A) a positive agglutination in 1-400 dilution is significant

	1-25	1-50	1-100	1-200	1-400	Neg
OXA	76 2-81 8	18 2-26 8	1 2-5 9*	0 5-2 2*	0-0 7	18 -23 8
X2	50 2-63 9	27 1-40 1	8 3-20 8	3 1-9 3	0 8-2 4	35 8 -49 7
X\19	39-45	20-22 4	5 7-9 6	0 4-2 6	0-1 1	55 9-60 1
X19	79 8*-87 2	66 4 -73 2	42 5 -49 1	21 2 -28 4	8-14 2	13 7-20 2

John W D Megaw

SOHNENSCHIN (C) Pseudo Weil Felix Reaktion bei Proteusinfektion [The Pseudo Weil Felix Reaction in Proteus Infections] — *Deut Med Woch* 1943 Jan 8 Vol 69 No 1 pp 11-12

The author has already described a pseudo Weil Felix reaction in two patients suffering from septic infections in which streptococci and *Proteus vulgaris* were isolated from the discharges In one of these the titre was 1-1 600

In a recent case of traumatic empyema from which the same organisms were isolated there was a reaction to *Proteus* O\19 at a titre of 1-200 and a negative reaction to *Pr* V2 and V4 The results were the same with serum inactivated by heat The serum did not react to the patient's own strain of *Proteus*

Wound secretions of 134 persons were investigated from 38 of these strains of *Proteus* were isolated all were H strains except two which were O The sera of 18 agglutinated *Pr* V19 in dilutions of 1-100 to 1-640 only four reacted when the sera were inactivated so there was no possibility of distinguishing between the true and the pseudo-reactions by this means Rickettsial agglutination was tried in three cases all of which gave definitely positive reactions in titres of 1-80 to 1-160 as compared with the Weil Felix reactions of 1-160 to 1-320

The author regarded Weil Felix titres of less than 1-2 000 as inconclusive in persons with septic infections unless the symptoms pointed definitely to the diagnosis of typhus Rickettsial agglutination does not help it is positive in *Proteus* infections as well as in typhus

John W D Megaw

AHRENS (Walther) Die Trockenblutagglutination zur Fleckfieber diagnose [The Dry Blood Agglutination Test for Typhus Fever] — *Arch f Hyg u Bakt* 1942 Vol 128 No 4/5 pp 216-227

With 2 figs [31 refs]

The technique devised by KUDICKE and STEUER (1940) was adopted [this *Bulletin* 1942 Vol 39 p 372] Slides measuring 15 x 6 cm were used on these it was possible to apply 18 droplets of blood and to test the agglutination of three dilutions of each of six different organisms

11 two strains of *Proteus O 119* and one each of typhoid paratyphoid B Shiga Kruse and Flexner bacilli. The dilutions were about 1-17, 1-33 and 1-50. A chart was used to show the position of suspension on the slide but it must have been something of a feat to prepare and observe 18 suspensions at a time.

The readings were made after 15 and 30 minutes. The total number of blood samples tested was 1409 of which 1074 were from known or suspected cases of typhus. The following results were those obtained with the Berlin strain of *Pr O 119*—those observed with the Leipzig strain were significantly different.

Of 807 samples which had given negative Weil Felix reactions only 21 gave weakly positive reactions to the test after 30 minutes and only 7 after 15 minutes of observation. Of 64 samples with a Weil Felix titre of 1-50, 37 were positive to the test, most of them weakly. Of 39 samples with a Weil Felix titre of 1-100, only 4 were negative to the test and all the 179 samples with titres of 1-200 and over were positive.

The presence of heterologous agglutinins was shown by the test just as with the Weil Felix reaction—of 79 samples strongly positive to the Weil Felix and the dry blood test, 44 gave weakly positive reactions to the Flexner group by the latter test and 5 of these gave moderate positive reactions to typhoid and to paratyphoid B. One sample was weakly positive to paratyphoid B alone. These heterologous agglutinins must to some extent be associated with the immunizing mechanism of typhus because they were found in 58 per cent of the cases with strongly positive Weil Felix reactions and only in 24 per cent of those with negative reactions.

Some useful hints are given about the technique.

[This kind of test is likely to be very useful in making rapid surveys of communities and in bedside diagnosis. A single dilution would probably suffice in most cases. In fact in the present series the low titre dilution almost always gave as much information as the three suspensions if the intensity and time of appearance of the reaction were taken into account. A set of six dry smears could easily be made on a glass slide and tested with suspensions of six suitable organisms. The smears could be separated from each other with strokes of a wax pencil as suggested by Steuer. The abbreviated name of the test in German is the T B A test—perhaps in English the name dry blag test would be more suggestive of the nature of the reaction.]

John W. D. Meau

CLAVERO (G.) & PÉREZ GALLARDO (F.) La prueba intradérmica de Giraud en la infección tifoexantemática. Nuestra experiencia personal. Técnicas y posibilidades de su aplicación. [The Giraud Intradermal Test in Typhus Fever]—65 pp. With 9 figs. (1 coloured). [30 refs.] Publicaciones de la Revista de Sanidad e Higiene Pública. Madrid. 1942. Dec.

After trials of various antigenic substances culture of Rickettsiae grown by Cox's method were found most suitable. Suspensions made from the vitelline membranes before the death of the embryo chicks were much more effective than those made from other embryonic tissues. Four strains of *Rickettsia prowazekii* isolated in Madrid were tested, one caused a weak dermal reaction, the other three caused typical skin lesions in white rabbits between the third and fifth days. There was a central necrotic spot surrounded by a zone of nodulation and an outer zone of hyperaemia.

For the test 0.25 cc of undiluted serum was mixed with an equal quantity of diluted suspension of richly infected vitelline membrane the mixture was kept for not less than 20 minutes and not more than 90 and was then injected intradermally into white rabbits whose backs had been shaved with an electric safety razor. Three dilutions were made in each case 1-10 1-100 and 1-1 000. Three similar dilutions of the suspensions unmixed with serum were injected as controls.

With four specimens of serum from cases of other diseases no evidence of protection was found but the sera of 40 patients in various stages of convalescence from typhus gave positive reactions though in two of these the protective action of the serum was decidedly weak. It was also weak in one patient in the eleventh month of convalescence and completely absent in another in the tenth month.

The reaction promises to be useful in disclosing inapparent attacks and in estimating the protective value of vaccines and sera. Full details of the experiments are given.

John W D Megaw

LEWICHI (Edwin) Ein Beitrag zur Klinik und Diagnose des Fleckfiebers [Clinical and Diagnostic Observations on Typhus Fever]—*Wien Klin Woch* 1942 Dec 25 Vol 55 No 52 pp 1024-1027 With 1 fig

The author claims that typhus fever on the Russian front has been restricted to small outbreaks by prompt and energetic measures of control. In spite of great variations in the severity and clinical features of the disease an early diagnosis can usually be made on purely clinical grounds.

The fever has a rapid onset the high continued fever stage is reached in two or three days after a step like rise which is more rapid than in typhoid. The plateau of the curve lasts about 11 days during the last two or three of which there are often remissions of one or two degrees (Centigrade). By about the 14th day the fall by lysis begins this lasts about three days.

The chief features of the onset are the swollen drunken like facies enlargement of the spleen at least by percussion disturbance of speech and the obvious illness of the patient. Quite early the tongue is dry and has a thick brown coating. A significant rise in the Weil-Felix titre comes too late for early diagnosis even when there are facilities in the field for carrying out the test.

The rash appears on the fourth or more often on the fifth day the spots vary greatly in size and colour they often fade after 12 hours or so. They are first seen on the chest then on the back and upper arms. They may be difficult to detect in soldiers suffering from scabies or abrasions due to scratching. Petechiae are often absent.

The cerebral symptoms are in proportion to the circulatory disturbances. The pseudo crisis was never seen though sometimes there was a fall in the temperature during the continued fever stage accompanied by circulatory failure and followed by a fresh rise with restoration of the circulation.

The treatment was on the same lines as in other severe fevers. Caffeine and strychnine were given thrice daily by subcutaneous injection and a quarter of a milligramme of strophanthin was given once daily. The e doses were given twice as often in severe cases. Euba in [sulphapyridine] was also given to prevent pneumonia. Convalescent serum and transfusions of the blood of inoculated persons were useless.

Plenty of fluid was given by the mouth. Apart from unforeseen complications a good idea could be formed of the prognosis from the condition of the patient in the early stages of the illness. Stress is laid on the lowering of the convalescence nervous symptoms often persisted for two or three weeks after the end of the fever and circulatory weakness might last for weeks or even months.

The author emphasizes the importance of early diagnosis by clinical observation and the failure of laboratory methods to give help at the time when this is most needed.

John H. D. Meyer

LOO (W.) Die Kältekonserverung des Fleckfiebertvirus. [Preserving Typhus Virus by Cold.—*Dtsch. Trop. Ztschr.* 1942, Nov. 15, Vol. 46, No. 22, pp. 564-565.]

Several workers have shown that murine and other strains of Rickettsia can be kept alive in animal tissues for periods up to 169 days at temperatures of 10 to 20 C. Scarcity of animals forced the author to adopt this method in maintaining four strains of *R. prowazekii*. At a temperature of 18 C. one strain survived up to 196 days while another lost its virulence after periods of 47, 50, 64 and 194 days although on one occasion it survived for 37 days and on another for 61 days. All four strains were maintained without any failure for four or five successive periods of about 30 days. These periods were alternated with intraperitoneal inoculations of guinea pigs.

The brains of the animals were removed aseptically and were kept in sterile glass tubes without the addition of any preservative.

John H. D. Meyer

VARELA (Gerardo) & PALADA (A.) (Miguel Argel) Inyecciones intraperitoneales de sangre para obtener pululacion de *Rickettsia prowazekii* (Estudio de 3015 ratas). [Enriching the Growth of *R. prowazekii* by Intraperitoneal Injections of Blood.]—*Rev. Inst. Salubridad. E. for. y H. T. op. Mexico* 1942, Dec., Vol. 3, No. 4, pp. 293-295.]

Since 1937 the authors have enriched the growth of orchotic strains of Rickettsia in the peritoneum of the rat by intraperitoneal injections of fresh heart blood of guinea pigs. The average amounts of blood were 10 cc. 4 hours after inoculation, 5 cc. 7 hours after inoculation and 3 cc. 9 hours after inoculation. The doses were modified according to the rate of absorption and the general condition of the rats. The rate of absorption could be estimated more easily in animals whose abdomens were shaved. The rats were killed on the 5th day after inoculation.

Altogether 3015 rats were inoculated with "animal washings" from 67 infected guinea pigs. Rickettsiae were difficult to detect in the washings of 157 guinea pigs; they were few in 162, moderately numerous in 112, abundant in 119, and very abundant in 37.

Death among the inoculated rats were—1st day 24, 2nd day 57, 3rd day 158, 4th day 297, and 5th day 73. The rest were killed.

The number of rats used for the detection of Rickettsiae in the peritoneum was 1897. The findings were very scanty 334, few 235, moderately numerous 368, abundant 385, and very abundant 575. There were 175 cases of contamination with bacteria. The method is claimed to have the advantages of simplicity and economy of material.

[The strain is called *R. prowazeki* in the title but from the text it is clear that an orchutic (*R. mooseri*) strain was employed.]

John W D Megaw

PATINO CAMARGO (Luis) Tifo murino en Bogota. Nota preliminar [Murine Typhus in Bogota (Preliminary Note)]—*Bol. Oficina Sanitaria Panamericana* 1942 Nov Vol 21 No 11 pp 1090-1099 With 6 figs on 2 plates English summary

Light strains of virus of the exanthematic typhus rickettsia type have been isolated in Colombia. These fall into three groups (1) Tobia spotted fever [tick borne] (2) epidemic typhus [house borne] of which an outbreak in Bogota has already been described by the author [this *Bulletin* 1942 Vol 39 p 542] and (3) murine typhus [flea borne] dealt with in the present note.

Investigations were made in three separate places in Bogota in each of which orchutic strains of Rickettsiae were isolated from the blood of a patient and in rat fleas caught in the immediate surroundings in two of the places Rickettsiae were also isolated from rats caught in the vicinity.

In two of the localities single cases occurred both were typical severe cases of typhus. In the third locality seven cases occurred in a rat infested hostel between the end of April and the end of June 1942. The intervals in days between the onsets of the successive cases were 7 25 8 1 8 and 2. The fever lasted from 8 to 10 days in 3 from 14 to 15 days in 3 and 18 days in the remaining case. A rash was seen in four of the patients. There were no deaths.

The rats were *Rattus norvegicus* and *Rattus rattus*. The fleas were identified in only one locality they were *Ceratophyllus* (*Nosopsyllus*) *fasciatus* and *Leptopsylla segnis*.

John W D Megaw

DAVIS (G E) The Rocky Mountain Spotted Fever Rickettsia in the Tick Genus *Ornithodoros*—*Proc. 6th Pacif Sci Congr* 1939 Vol 5 pp 577-579 [Summary taken from *Rev. Applied Entom. Ser. B* 1943 Mar Vol 31 Pt 3 pp 41-42]

An account is given of experiments in which Rocky Mountain spotted fever was transmitted to healthy guinea-pigs by nymphs and adults of each sex of *Ornithodoros parkeri* Cooley that had fed in earlier nymphal instars on infected ones. Another guinea-pig was infected by injection of eggs laid by an infected female. Similar tests with *O. turicata* Dugès gave negative results but this species could harbour the infection. The localities in which *O. parkeri* has been collected all lie within the region in which Rocky Mountain spotted fever is endemic and in which *Dermacentor andersoni* Stiles transmits it to man and *Haemaphysalis leporis palustris* Pack. among animals and *O. parkeri* infests susceptible hosts of these ticks. These facts and its ability to transmit the infection experimentally suggest that it may help to maintain it in nature.

PHILIP (C B) Rocky Mountain Spotted Fever. Known and Potential Tick Vectors in the United States—*Proc. 6th Pacif Sci Congr* 1939 Vol 5 pp 581-584 [11 refs.] Summary taken from *Rev. Applied Entom. Ser. B* 1943 Mar Vol 31 Pt 3 p 42]

In view of the fact that the area of the United States in which Rocky Mountain spotted fever is known to be endemic has recently

been widely extended to include all the States except Kansas, Wisconsin, Michigan, Maine, New Hampshire, Vermont, Connecticut and Rhode Island; a summary is given of present knowledge on the known tick vectors (*Dermacentor andersoni* Stiles, *D. variabilis* Say and *Haemaphysalis leporis palustris* Pack.) and the species that transmit the disease experimentally and are thought to be potential vectors in nature (*Amblyomma americanum* L., *A. cayennense* F., *D. occidentalis* Marx, *Rhipicephalus sanguineus* Latr., *D. parumapertus* Neum. and *Ornithodoros purkensi* Cooley).

YELLOW FEVER

It has been pointed out that in the Summary of Recent Abstracts on Yellow Fever [this *Bulletin* 1943 Vol. 40 p. 97] an incorrect reading of Findlay's view of the maintenance of rural yellow fever in West Africa has been given. Findlay (1941) stated that although at present the only two definite factors known to be concerned in spread are the infected mosquito and the infected human being, before it is possible to give an answer to the question whether animal (bats, squirrels and other small rodents) play any rôle in maintaining endemic yellow fever it will be necessary to examine some hundreds of specimens instead of as at present just under fifty.

The comment on Findlay's paper therefore does not apply and there is no antithesis between his views and those of the Rockefeller workers.

WHITMAN (Lorin). A Modified Intraperitoneal Protection Test for Yellow Fever based on the Greater Susceptibility of Immature White Mice to the Extraneural Injection of Yellow Fever Virus—*Amer. J. Trop. Med.* 1943 Jan. Vol. 23 No. 1 pp. 17-36 With 2 figs. [11 refs.]

This paper furnishes a valuable discussion of many of the variable factors involved in the development of a mouse protection test which will be satisfactory for all purposes in the investigation of yellow fever problems. In 1931 SAWYER and LLOYD [see this *Bulletin* 1933 Vol. 29 p. 198] described an intraperitoneal protection test for yellow fever in adult white mice which has not only been of the utmost value in determining the geographical distribution of yellow fever but has been equally important in the study of the disease both in the field and in the laboratory. This test is based on the fact that although adult white mice are relatively insusceptible to the extraneural injection of yellow fever virus they become uniformly susceptible following cerebral trauma. There are three chief disadvantages to this test. In the first place 3 cc. of serum are required for a single test. Although this is of little importance when dealing with man or larger animal it hinders routine work on small serum samples such as can be got from small animal or birds. Secondly, because of the large virus dose required per mouse, fresh unstandardized virus preparation must be used. Thirdly, the supplementary starch injection into the brain not only increases mortality through manipulation but also increases the labour and time consumed.

These disadvantages were partially overcome in the intracerebral protection test first described by THEILER and more recently refined by BUGHER [see this *Bulletin* 1931 Vol 28 p 723 1941 Vol 38 p 434]. This test relies on the injection of serum virus mixtures directly into the brain. Not only are the virus requirements infinitesimal compared with the dosages needed for successful intraperitoneal tests but the quantity of serum needed is likewise minimal. As it is necessary to have a test virus preparation that is stable and of known strength well desiccated virus suspensions are required. The chief disadvantages of the intracerebral test are that some species of animals and birds possess substances in their sera which are highly toxic for mice on intracerebral inoculation yet which do not affect mice when injected intraperitoneally. The same is true for sera which are contaminated with moderately pathogenic bacteria or fungi. Secondly slight variations in the technique of intracerebral injections such as the point of injection and depth may result in significant discrepancies in the results. It appeared therefore that an intraperitoneal test which could be performed with a single injection and would require but a small volume of serum per test would have value. THEILER [this *Bulletin* 1930 Vol 27 p 872] and BUGHER [ibid 1941 Vol 38 p 437] have previously pointed out that baby mice were much more susceptible to the extraneural injection of yellow fever virus than were adult mice. In fact it appears that during the first days of life they are as susceptible to virus injected subcutaneously as are adults to virus introduced intracerebrally. On the theory that the transition from full susceptibility to relative resistance was gradual the author decided to study the intermediate ages of 14 to 35 days to see whether there could be demonstrated an age at which satisfactory intraperitoneal protection tests could be performed without the supplementary starch injection into the brain and utilizing smaller doses of both serum and virus than are necessary for the adult test.

Young mice of several ages were injected intraperitoneally with one tenth the quantity of both serum and virus normally required in the standard intraperitoneal test. The results indicated that up to 21 days of age the young mice were quite susceptible to the dosage of virus used but that beyond that age the percentage of mice killed by the virus fell relatively rapidly. Furthermore failure of immune serum to protect completely 7 and 15 day old mice indicated that they were too sensitive to the selected virus dosage to be protected by the immune serum. While it was felt that by reducing the virus dosage a test could be devised for these younger mice the fact that they were too young to be weaned from their mothers offset the value of their greater sensitivity. For this reason it was decided to limit further investigations to mice between 18 and 21 days of age. It was found that although at any one age the smaller mice are more susceptible to virus than the larger the difference is less than that observed between mice of different ages. Small 21 day mice are more resistant to virus than 18-day old mice even though the latter outweigh them. No evidence was found to indicate that sex influences the level of immunity at any age.

When two parts of immune serum are added to one part of virus the results of injecting 0.06 cc. of the mixture into 18 to 21 day mice are equivalent to injecting adult mice which have received intracerebral starch with 0.6 cc. By increasing the proportion of immune serum to virus and increasing the volume of the inoculum so that the amount

of virus received by each mouse remains the same the protective capacity of the immune serum is augmented. The presence of small amounts of antibody can thus be easily demonstrated. It appears therefore that this test will be particularly useful in testing wild animal sera and the sera of post vaccination groups in both of which antibody levels may be extremely low.

The chief disadvantage of this test is the fact that only mice of uniform and exactly known age must be used. Only those laboratories breeding their own mice are in a position to meet this prerequisite. Another disadvantage of the test is the periodic fluctuation in susceptibility of young mice to standardized virus doses. These fluctuations require constant attention to dosage to keep the test on a more or less uniform basis.

The technique of the test is set out in great detail. The French strain of neurotropic virus was used throughout in the form of a 15 or 20 per cent suspension by weight of infected mouse brains in either physiological saline or a 5 to 10 per cent normal serum in saline diluent. For the sake of uniformity the virus used has been restricted to the 500th to 600th passage in mice. As control a titration of a known standard immune serum was included in each group of tests. In addition the test virus was titrated intraperitoneally to give direct evidence of its strength. The mice are checked daily and the results noted on the same type of cards as were recommended by SAWYE and LLOYD. At the end of 10 days the results of the test are read in the same manner as to the standard test. *Hugh H. Smith*

SOPER (Fred L.) Febre amarela Panamericana 1938 a 1942 [Yellow Fever in the Americas 1938-1942. — *Bol. Oficina Sanitaria Panamericana* 1942 Dec Vol 21 No 12 pp 1207-16 1221-2. English summary pp 1251-1252]

In this paper Soper reports to the Eleventh Panamerican Sanitary Conference as he had previously done to the ninth and tenth conferences [see this *Bulletin* 1935 Vol 32 p 882 1941 Vol 38 p 71] the situation as regards yellow fever in South America for the preceding four year period. He was able to state that (1) epidemics transmitted by *Aedes aegypti* and originating from other outbreaks of *aegypti* transmitted yellow fever had not been observed in the Americas since 1934. (2) that only one outbreak of *aegypti* transmitted yellow fever secondary to jungle yellow fever had been discovered during the period in São Madureira Territorio do Acre at the beginning of 1942. (3) that outbreaks of jungle yellow fever had been discovered in the States of Espírito Santo Rio Grande do Sul Santa Catarina Bahia Pará Amazonas and the Territorio do Acre of Brazil in Bolivia in Peru in Colombia and in Venezuela.

Epidemiological observation during this four year period demonstrated that jungle yellow fever occurs in a great variety of conditions where there are wide differences in the type of bush of mosquito s of animals and of climate. The author states that cases of human jungle yellow fever in South America are probably secondary to epizootics in the forest. He offers the hypothesis that in some forested regions there are sufficient population of susceptible animals and mosquito vectors to make it possible for the infection to be permanently maintained on a basis of a mosquito-to-animal mosquito cycle.

Great progress is reported in the anti *Stegomyia* campaign. The present programme of the Yellow Fever Service of Brazil is the complete eradication of *Aedes aegypti* from the country. Already the species has been eliminated from the States of Maranhao, Espirito Santo, Goiaz, Parana, Santa Catarina, Minas Gerais and the Distrito Federal. Bolivia, Peru, Brazil and Colombia are collaborating on a programme to free the entire Amazon Valley of this mosquito.

Vaccination has proceeded during the period with the 17D strain of virus. In the main the results have been satisfactory and the duration of immunity appears to be very long. In 1938-39 the vaccine used during an epidemic in Espirito Santo failed to give satisfactory immunity to those vaccinated. It was found that the strain of virus used had apparently lost most of its antigenicity through prolonged passage in tissue culture. When earlier subcultures were resorted to the results were again good. Another complication encountered in Brazil was the occurrence of a considerable number of cases of fatal delayed jaundice following vaccination. It was thought that this phenomenon was due to the human serum component of the vaccine. When the use of serum was discontinued in the preparation of the vaccine no cases of jaundice were observed among the 347 000 individuals who have received the new vaccine since 1940. During 1941 a third difficulty was encountered. In an area in which 50 000 persons were vaccinated 199 of them showed signs of an involvement of the nervous system. It was thought that they suffered from an encephalitis due to a slight modification of the vaccine virus. Fortunately all of these cases recovered. Following the selection of another substrain of the vaccine virus no cases of unusual reaction to vaccination have been observed. The following recommendations for the future yellow fever programme of the continent are made—

- (1) The anti larval campaigns should be organized on a permanent basis in the principal ports and cities where *Aedes aegypti* abounds for the purpose of eradication of the species from this continent.
- (2) Viscerotomy should be organized in all jungle regions of countries where yellow fever has been endemic in order to ascertain where vaccinations should be applied. With the organization of antilarval work as recommended above there will be no need for urban viscerothomy.
- (3) Large scale vaccination should be employed to protect populations exposed to jungle yellow fever and for the immunization of the crew and passengers of aircraft.

With a programme of *aegypti* eradication there should be no need for general urban vaccination.

Hugh H. Smith

ANDUZE (Pablo J) Distribucion geografica de los baemagogus Venezolanos y su posible relacion con la fiebre amarilla selvatica [Geographical Distribution of Venezuelan Species of Haemagogus and their Possible Relation to Jungle Yellow Fever]—*Rev. Sanidad y Asistencia Social* Caracas 1942 Dec Vol 7 No 6 pp 821-824 With 2 maps

Following reports from Brazil that *Haemagogus* mosquitoes can transmit by bite the virus of yellow fever [see this *Bulletin* 1939 Vol 36 pp 27-28] the author decided to accumulate the known data on the distribution of these mosquitoes in Venezuela.

Of the four species of *Haemagogus* known in Venezuela *Haemagogus celestis* is the most widely distributed. *Haemagogus capricornis*, *Haemagogus equinus* and another species probably *Haemagogus albomaculatus* have been discovered also in a number of wooded areas in various parts of Venezuela.

[Since the distribution of jungle yellow fever has not been fully studied in Venezuela it is not possible at present to correlate the occurrence of the disease with the presence of *Haemagogus* mosquitoes.]

Hugh H. Smith

PLAGUE

PALESTINE. DEPARTMENT OF HEALTH. ANNUAL REPORT FOR YEAR 1941. pp 6-9. With 1 folding map. [Plague.]

The trapping and laboratory examination of rats has been a routine in Palestine since 1920. It proved its value in Haifa in 1941 when plague was demonstrated in a rodent taken in the port. Fortunately the harbour is of recent construction and during the building close attention had been paid to rat proofing. Energetic measures were taken at once but 2 months later the first human case occurred and nine others were reported during the year. Treatment with sulphapyridine was given and there were no deaths. Inoculation with plague vaccine was confined to contacts.

Measures against rats included trapping and demolition of rat harbourages. 4 000 wood and tin shacks were dealt with. Rat proofing was undertaken extensively at a cost of £7 000. Demolition resulted in eviction of over 400 families and accommodation had to be found for the people. Credits of £10 000 were given to those prepared to replace their shacks by stone houses.

At the beginning of the outbreak the proportion of *R. rattus* was 63 per cent of the rats obtained. At the end of the year it was 2.7 per cent. *X. cheopis* was by far the commonest flea. Rat destruction was carried out by trapping or killing with batons. Poisoning with bait smoke or other methods was not adopted.

C. B.

BERKMAN (Sam). Accessory Growth Factor Requirements of the Members of the Genus *Pasteurella*. — *Jl Infect Dis* 1942 Nov - Dec Vol 71 No 3 pp 201-211 [Refs in footnotes.]

The genus *Pasteurella* is regarded as made up of three sub-groups of well defined type. (1) Haemorrhagic septicaemia organisms () the tularaemia organism which is placed among the *Pasteurellas* and (3) the two closely related organisms *P. pestis* and *P. pseudotuberculosis*. This division is founded primarily on the distinctive diseases caused by the several organisms in man or animals and on immunological relationships. Confirmation of the soundness of the classification is obtained by investigating their growth requirements in nutrient media. Two classes of basal medium were employed one a hydrolysed purified gelatin with amino-acids, inorganic salts and glucose the other a medium which dispensed with the hydrolysed gelatin and had a definite chemical composition in which the usual amino-acids necessary for growth were represented. More interesting still than the use of

the synthetic media themselves are the experiments made on the results of addition to these basal media of accessory growth substances or their derivatives. By a process of progressive simplification in the composition of the media it was found which of the accessory growth substances was really essential. The nutritional requirements of the three subgroup mentioned varied very distinctly. Some of the accessory substances or substances thought to be such were nicotinamide, thiamin, cocarboxylase, riboflavin, pantothenic acid, diphosphopyridine nucleotide, biotin, concentrate, nicotinic acid, vitamin K, choline, para-amino-benzoic acid, oleic acid. It was found that (1) The hemorrhagic septicemia pasteurellas developed in a hydrolyzed gelatin basal medium when nicotinamide (or di- or triphosphopyridine nucleotide) and pantothenic acid were added. Nicotinic acid was not a substitute for these substances. (2) *Past. tularensis* grew slowly in a hydrolyzed gelatin basal medium plus thiamin or cocarboxylase. These cultures did not develop in an amino acid medium with the addition of known accessory growth factors. (3) *Past. pestis* and *Past. pseudotuberculosis* were comparatively easily grown requiring none of the known accessory growth factors and developing well in a medium of amino acids, inorganic salts and glucose.

H. F. Harvey

CHOLERA

NAPIER (L. Everard) & GUPTA (S. K.) Survival of *Vibrio cholerae* in Gastric Juice — *Indian Med. Ga.* 1942 Dec Vol 77 No 12 pp 717-721

It has been found by PASPICHIA and others that the gastric acidity in cholera convalescents is consistently low, only 12 per cent having been found to show even a normal curve. The explanation of this fact is that (1) it is the after result of cholera, (2) it is a factor which has contributed to the cholera infection. Persons with a low acid curve are more liable to get cholera. The present authors support the second of these views by their experiments given in four tables — Table I Effect of different samples of gastric juice on cholera vibrio cultures in a case of hyperchlorhydria. Table II Effect of different samples of gastric juice on cholera vibrio cultures in a case of hypochlorhydria. Table III Chart showing life of cholera vibrios in hours in gastric juice of different ranges of free and total acidity. Table IV Life of cholera vibrios in diluted gastric juice in 10 cases. Their conclusions are —

Cholera vibrios are killed very rapidly when they come in contact with gastric juice with an acidity of 22 degrees or more, and in the presence of any free acid they do not survive long. In the absence of acid they may survive up to 15 days. Whilst admittedly the gastric juice is subjected to considerable dilution *in vivo* the presence of even small amounts of free hydrochloric acid is so fatal to the vibrio that it seems justifiable to conclude that the individual with a low acid gastric juice may be much more susceptible to cholera infection than the individual with a normal or high acid content.

H. F. Harvey

RANTA (L. E.) & DOLMAN (C. E.) Observations on Cholera Vaccine —
Canadian Jl Public Health 1943 Jan Vol 34 No 1 pp
 26-37 [12 refs]

Under war conditions with the possibility of service in tropical countries the advisability of making and standardizing cholera vaccine in bulk was early considered in Canada. A satisfactory method of assay of cholera vaccine has been sought for and for the most part this has reduced to titration of agglutinin production. It was well recognized of course that agglutination response was far from being a satisfactory test of immunity. Still it was undoubtedly one form of antigenic response. Injection of heat killed phenol killed and formalin killed *V. cholerae* suspensions into rabbits resulted in the highest and best maintained O and OH titres being evoked by phenol killed vaccine. One important factor in the provision of vaccines for troops is that protection is required against more than one disease. Admixture of cholera vaccine with T A B T occasioned no significant loss in the capacity of the mixture to produce typhoid and cholera. O and OH agglutinins in rabbits. Some preliminary experiments have been carried out in the endeavour to find an animal protection test as a measure of immunization. Mice seemed to be suitable animals for the purpose especially since the experiments of GRIFFITHS [this *Bulletin* 1942 Vol 39 p 764] have shown that the addition of mucin to a suspension of virulent *V. cholera* increases its killing power for young white mice at least a thousand fold. This effect of mucin was confirmed and all six strains now used in the manufacture of Connaught Laboratories vaccine will regularly kill within 72 hours at least 60 per cent of young mice injected intraperitoneally with 500 000 mucinized vibrios. A mouse protection method of assaying the antigenic potency of cholera vaccine has been tentatively put forward by the National Institute of Health at Washington and is based upon the percentage survival of mice tested with mucinized suspensions. This requirement is that at least 50 per cent of the mice in each vaccinated group should survive for 72 hours while at least 75 per cent of the non vaccinated mice should die of cholera septicaemia within 72 hours.

W. F. Harvey

BACILLARY DYSENTERY

FAIRLEY (N. Hamilton) & BOYD (J. S. K.) Dysentery in the Middle East with Special Reference to Sulphaguanidine Treatment —
Trans Roy Soc Trop Med & Hyg 1943 Mar Vol 36 No 5
 pp 253-278 [15 refs] Discussion pp 279-286 [CRICKSHANK
 (Robert) MANSON BARR (Philip) SMYTH (H. J.) BOLAND
 (E. R.) RIDING (D.) FELIX (A.) FAIRLEY (N. Hamilton)
 (in reply)]

This paper must be regarded as an amplification of the work already reviewed [see this *Bulletin* 1942 Vol. 39 p 319]. The outstanding feature of bacillary dysentery in the Army during 1940 and 1941 has been its mild character — even in Shiga infections the mortality has not been as high as was expected and there has been an absence of large-scale epidemics.

Motor transport and mechanization have eliminated the chief sources of fly breeding whilst field and stationary camp sanitation has reached a higher level than during the 1914-1918 war

In tropical countries such as Java bacillary dysentery is mainly a water borne disease and prevention consists in water sterilization but in the Middle East there has been no difficulty in maintaining a safe water supply and infection is mainly fly borne but uncooked food such as lettuce is always suspect as human excrement is so often used as fertilizer In forward areas it is not possible to dig trench latrines therefore troops are instructed to scoop out a shallow hole and cover up the excreta immediately with a thin layer of loose earth or sand to prevent immediate access of flies and to permit subsequent desiccation

Food must be protected from flies along lines of communication it has been found that desert flies dislike entering any roofed structure which is darker inside than out

Fly proof latrines are essential In order to prevent promiscuous defaecation deep trench latrines of the Moslem type were provided with fly proofed superstructures and covers which closed automatically

Dysentery cases were nursed in special wards sited wherever possible close to the laboratory A wire screened room in the rear of the ward contained a screened cupboard to hold bed pans an incinerator and two copper boilers for sterilizing bed pans Incineration of faeces mixed with sawdust gave out no objectionable odour

A standard method was employed for isolation and classification of dysentery bacilli organisms were grouped into the non mannitol and mannitol fermenting groups the former embracing Shiga and Schmitz bacilli the latter Sonne's bacillus and the Flexner Boyd group

Antisera were provided to permit identification two polyvalent sera covered the Flexner and Boyd I groups Analysis of 8 665 cases of dysentery in which the causal organism was isolated is given —

<i>Entamoeba histolytica</i>	12.3 per cent
<i>Bact dysenteriae</i> Shiga	15.8
Schmitz	5.2
Sonne	6.3
Flexner Boyd I	52.3
Other non mannitol fermenters	3.6
Other mannitol fermenters	4.5

Successful isolation depends upon freeness and absence of faecal matter More successful results are now being obtained with the new desoxycholate medium Where specimens have to be sent for some distance the mucus should be placed in 30 per cent glycerine in normal saline adjusted with sodium phosphate to pH 8 and tinted with phenol red—as an indicator against acidity

The value of the diagnostic cellular exudate has been amply confirmed but as the case advances so the cellular composition changes Sigmoidoscopy has proved of value in subacute cases which fail to clear up within three weeks and in differential diagnosis from amoebiasis

In cases where dysenteric symptoms persist longer than the third week the mucous membrane may remain universally inflamed or it may be normal or limited areas may show ulceration due to *Bact dysenteriae* (especially Flexner) These constitute a large proportion of carriers of the infection

In severe chronic bacillary dysentery the large intestine may be tubular in outline the wall thickened contracted and difficult to distend the surface composed of red granulation tissue sometimes with pseudopolyps.

In others superficial oval or circular ulcers are seen scattered over apparently normal mucosa and from these *Bact. dysenteriae* Shiga has been isolated. Most Flexner cases were mild and dehydration did not develop. On the other hand febrile diarrhoea in which numerous stools were passed proved to be bacillary dysentery.

Acute fulminating Shiga dysentery is rare but in one case death supervened within a period of 32 hours. In cases with insidious onset severe intestinal symptoms and fever may not supervene for several days but as the infection progresses toxæmia increases.

Occasionally renal failure was noted with albuminuria granular casts and nitrogenous retention. Oliguria abdominal distension and hiccups are characteristic of this condition. The complications of both Shiga and Flexner types of bacillary dysentery were infrequent and mainly encountered in severe infections. They were intestinal hæmorrhage perforation with peritonitis chronic peritonitis with localized or general effusion of peritoneal fluid pneumoperitoneum in one case portal pyæmia and multiple abscesses of the liver hæmorrhoids sometimes thrombosed and rectal prolapse. The systemic complications were peripheral circulatory and renal failure toxic arthritis peripheral neuritis conjunctivitis and iritis pneumonia parotitis petechial and purpuric rashes.

Renal failure has clinical resemblances to that of traumatic anuria (crush injury) and results from a combination of factors in which dehydration and toxæmia play an important part leading to reduced glomerular filtration and degenerative changes in the tubules.

The urine contains granular casts and albumin and there is azotaemia and oliguria which may pass on to anuria.

Renal failure of this type occurs in patients who have never received sulphaguanidine and therefore it cannot be attributed to this drug.

In routine treatment sodium or magnesium sulphate therapy was employed on the accepted lines for five days. For the first 24-36 hours water only was permitted to which was added glucose lactose or saccharose subsequently albumin and barley water tea and chicken broth. Refined anti-dysenteric Shiga serum (20 000 I.U. per cc) in doses of 5 to 10 cc (100 000-200 000 I.U.) was given intravenously and repeated daily. No serum reactions were noted in a series of over thirty cases.

Benefit obtained was transient and improvement not maintained. It should be reserved for fulminating or severely toxic cases immediately on admission to hospital. The action of sulphaguanidine and anti-dysenteric Shiga serum in Shiga infection is complementary since the former exerts a bacteriostatic action on dysentery bacilli whilst the latter neutralizes Shiga exotoxin. The portion of the paper dealing with sulphaguanidine treatment has already been abstracted [see the *Bulletin* 1942 Vol 39 p 319].

Regarding excretion sulphaguanidine is conjugated to a variable degree but both it and acetylsulphaguanidine are soluble in urine at pH 7.1. There is no advantage in alkalinizing the urine with a view to preventing deposition in the tubules. Crystals may appear in the urine during the first week but in the series of 371 cases treated with

sulphaguanidine there was no instance of renal complication such as haematuria

WEL (A J) Progress in the Study of Bacillary Dysentery—*Jl Immunology* 1943 Jan Vol 46 No 1 pp 13-46 [286 refs]
[Summary appears also in *Bulletin of Hygiene*]

This is a review of the present state of our knowledge of the epidemiological and bacteriological aspects of bacillary dysentery. There are numerous references to the recent literature most of which has been abstracted in the *Bulletin of Hygiene* or this *Bulletin*.

The importance of the subject is indicated by the figures of dysentery notifications in the United States (21 States). These show that while the incidence of the enteric fevers has fallen strikingly during the years 1933-40 that of dysentery has not done so. Further probably only severe cases are notified so that if the probable number of cases of dysentery is calculated from the known number of deaths and the average case mortality it is likely that about 700 000 cases (instead of the reported 79 000) occurred in these States in the years 1933-37.

Survey of the epidemiological reports suggests that dysentery incidence is the best indicator of the effectiveness of public sanitation. The immediate vehicle of infection is usually contaminated food with milk and cream playing a considerable rôle. The part played by flies is probably small. [This is a view which is not shared by recent workers in the Middle East though it may be true of the United States].

Dysenteric infection is carried from one locality to another by man and the number of permanent and convalescent temporary carriers has probably been underrated in the past. The new methods of culture have shown that patients with chronic dysentery excrete the organism more profusely than was thought but since these individuals are mostly incapacitated they are not likely to play a great part in the spread of the disease.

Measures of control in addition to modern methods of sanitation should include dissemination of information on the present aspects of dysentery amongst the medical profession emphasizing the importance of bacteriological diagnosis of discarding vague diagnostic terms (intestinal influenza, acclimatization diarrhoea and the like) and of being on the alert for dysentery with atypical clinical manifestations.

The rest of the paper contains a review of our knowledge of the bacteriology of the dysentery group, the chemistry and toxic effects of the various antigenic fractions isolated from the bacteria and sulphonamide treatment subjects which have recently received attention in this *Bulletin* and the *Bulletin of Hygiene*.

J C Cruickshank

LION (George M) The Chemotherapy of Bacillary Dysentery—*Further Observations on Sulfaguanidine*—*Jl Lab & Clin Med* 1943 Feb Vol 28 No 5 pp 645-650

This is a general account of the use of sulphaguanidine in bacillary dysentery and adds little to previous communications. It is concluded that sulphaguanidine has completely revolutionized the treatment of acute bacillary dysentery and is as effective as is sulphanilamide in the treatment of some streptococcal infections. A footnote is added

on the result of treatment of 14 patients with severe or moderately severe bacillary dysentery with succinyl sulphathiazole. The initial dose 0.08 gm per kilo was graded as twice the maintenance dose. The latter (0.04 gm per kilo) was given every four hours if six doses were exhibited daily or 0.05 gm per kilo if five doses were given daily at 4 hour intervals. After the diarrhoea had ceased for 72 hours the drug was discontinued.

In this comparatively small series succinyl sulphathiazole had all the virtues of sulphaguanidine was free from untoward effects and was exceedingly well tolerated.

P Manson Bahr

RELAPSING FEVER.

POSPELOVA-SHTROM (M V). *On the vector of relapsing fever in the USSR*. O n t h o d o r o s t a r t a k o - s k y i O l 1931 as a Vector of Tick Spirochaetosis.—*Med Parasit & Parasitic Dis* Moscow 1940 Vol. 9 No 6 pp 618-622. [In Russian]
Summary taken from *Re Applied Entom Ser B* 1943 Mar Vol. 31 Pt 3 pp 58-59.]

Ornithodoros tartakowskyi Olenov is common in the burrows of small rodents in the desert steppe regions of Central Asia but has not been recorded from dwellings. Investigations to determine whether it is a vector of relapsing fever were carried out in Moscow in the summer of 1939 with nymphs and adults collected in April from the burrows of hedgehogs near Ashkhabad in south western Turkmenistan. Spirochaetosis was produced in laboratory mice by the feeding of the ticks which showed that the latter were naturally infected. The strain obtained was maintained by serial passage in mice and was not pathogenic to guinea-pigs—it did not even cause a latent infection in them. The infected ticks did not however always transmit the disease to mice. In cases of transmission the incubation period lasted 5-8 days the spirochaetes usually appearing on the sixth day. Injection of blood from the mice caused a transient infection (occasionally latent) in rabbits and white mice but did not infect a hedgehog (*Erinaceus europaeus*) goldfinch or tortoise. Jerboas (*Meriones*) from Daghestan where *O. tartakowskyi* does not occur proved highly susceptible to infection produced by intraperitoneal injection of a suspension of the internal organs of ticks that had died 3-4 hours previously. It is suggested that jerboas probably including *Rhomomys opimus* which occurs in Central Asia and is often associated with *O. tartakowskyi* may serve as reservoirs of this strain of spirochaete in nature. It differs from the strain transmitted by other species of *Ornithodoros* such as *O. tholozani* Lab & Meun (*papillipes* Bur) and *O. ferrugineus* Olenov. Zas. & Fen in its pathogenicity to laboratory animals and the characteristics of the disease it produces and is probably identical with the species named *Spirochaeta latyschevi* by Sofiev. [See this Bulletin 1943 Vol. 40 p 314.]

MAZZOTTI (Luis) Estudio sobre la transmision de *Spirochaeta rene zuelensis* [On the Transmission of *Spirochaeta rene zuelensis*]—*Rev Inst Salubridad y Enfermedades Trop Mexico* 1942 Dec Vol 3 No 4 pp 297-301 English summary (5 lines)

That relapsing fever as seen in Panama Colombia and Venezuela is caused by one species only of spirochaete *Sp rene zuelensis* and that this is transmitted by *Ornithodoros rene zuelensis* and *O talaje* with equal facility are generally accepted as facts G E DAVIS has recorded finding naturally infected *O talaje* in the United States and transmitted the infection by the bite of ten specimens collected in Arizona In 1941 Dr Luis Mazzotti collected specimens of *O rene zuelensis* in Giron Colombia which he proved to be infective *O rene zuelensis* so he attempted to keep the strain going in the laboratory out experiments with 14 15 and 17 of the ticks which had fed on a rodent infected with *Sp rene zuelensis* 78 60 and 60 days before and set them to bite healthy rats Examination of the latter carried out systematically during a fortnight did not reveal a single infection He next allowed six lots of *O talaje* 10 to 25 in each which had fed 22 days before on rats infected with *Sp rene zuelensis* to bite a fresh series of rats and though examined for 19 days all were negative with one exception which showed spirochaetes on the thirteenth day It had been bitten by the group of ten ticks

Lastly triturated bodies of five specimens of *O talaje* which had fed six months before on an animal infected with *Sp rene zuelensis* were inoculated into four healthy rats and they became infected

It would seem therefore that *O talaje* is of very little importance epidemiologically in the transmission of *Sp rene zuelensis* Also the readiness with which Davis obtained transmission with *O talaje* points rather to the possibility that the spirochaete he found was a different species or a different strain of *Sp rene zuelensis* and that the usually recognized spirochaete recognized that is as *Sp rene zuelensis* is biologically different from those transmitted in nature by *O talaje* [An interesting paper opening up a wide field for further research]

H Harold Scott

WHEELER (Charles M) A Contribution to the Biology of *Ornithodoros hermsi* Wheeler Herms and Meyer—*Jl Parasitology* 1943 Feb Vol 29 No 1 pp 33-41 With 2 figs [15 refs]

YAWS

SCHRAMM (Eberhard) Die Behandlung der Frambosie mit Spirobismol [Spirobismol in the Treatment of Yaws]—*Deut Trop Ztschr* 1942 Dec 15 Vol 46 No 24 pp 605-606

The author when practising in Liberia noted as have all tropical practitioners that the natives will not persevere in a lengthened course of treatment nor can they afford expensive drugs such as aminoarsenobenzol hence the value of a cheap drug which brings about speedy cure This the author has found in Spirobismol a

combination of bismuth quinine and iodine. It is well tolerated and though he has treated many hundreds of patients he had not seen a single case of bismuth poisoning. The dosage is 3-5 cc. (=0.09-0.15 gm bismuth) for adults 1-2 cc for children and 0.3-0.5 cc for infants. Injections are made deep intramuscularly on alternate days. After three to four injections the mother jaw or secondaries clear. In tertiary jaws with lesions of the soft palate or sole or periostitis of tibia or ulna healing is slower and the author finds the best treatment to be 3-5 injections of aminoarsenobenzol followed by the Spirobismol. He concludes that Spirobismol is the most serviceable remedy for rapid cheap and certain healing of jaws for a physician in the tropics who has to undertake journeys in adverse condition and treat large numbers of patients.

H. Harold Scott

BOLETIM DO SERVIÇO DE FRAMBOEZIA. Minas Gerais 1941 Vol 5 No 3 4 pp.—O serviço de framboezia [The Yaws Service in the State of Minas Gerais]

This is a brief note of the work done in recent years by this organization which also assumes the treatment of leishmaniasis malaria tropical ulcer and other conditions. The Service includes a number of centres working under a single direction. Since 1934 25 186 persons have been treated for yaws.

C. H.

IRIARTE (David R.) La buba o bubas en Venezuela [Yaws in Venezuela]—*Rev. Facul. de Med. Bogota* 1942 June Vol 10 No 1^o pp 767-781

A general account of the disease containing much information which has already been abstracted in this *Bulletin*.

C. H.

LEPROSY

LEPROSY IN INDIA 1942 Oct Vol 14 No 4 pp 141-149—Report for 1941 of the Leprosy Research Department School of Tropical Medicine Calcutta

VERGHESE (G.) & RATH (R. C.) Epidemiological Features of Leprosy in Orissa—*Leprosy in India* 1942 Oct Vol 14 No 4 pp 130-138

The recently (1936) created province of Orissa situated to the south of Bengal and extending from the east coast to the east of the Central Province has a population of 8 600 000. Leprosy is widespread especially in the more humid coastal divisions. Surveys of the villages around certain dispensaries have been followed by inquiry in selected areas in each of the six divisions of the province the results of which are recorded in this paper. 276 122 persons out of nearly 500 000 in the areas were examined with the following results. The incidence among those examined was 1.3 per cent a fairly high rate and the total number of cases for the whole province is estimated at about 100 000. Classifications of 3000 cases showed that 2065 were rural and 935 lepromatous i.e. 31 per cent were of the more

severe and infectious form Males contributed 74.5 per cent but probably a smaller proportion of females were examined Children under 15 numbered 400 Agricultural colonies are advised for the isolation of lepromatous cases
L Rogers

CASTAÑE DECOUD (Amibal) Infiltración neural para arterial en la lepra tuberculoides Su importancia en el diagnóstico histológico [Para arterial Neural Infiltration in Tuberculoid Leprosy]—*Rev Argentina de Dermatosisifilologia* 1942 Vol 26 Pt 4 pp 913-924 With 10 figs

In 1940 states the author he made a communication on the importance of neuritis in histological differentiation of leprosy from other tuberculoid granulomata [he does not give the reference] The histological changes are well shown in a series of photomicrographs and he sums up the lesions in five grades or phases —

- 1 Neural infiltration without involvement of artery
- 2 Neural infiltration with displacement of artery
- 3 Neural infiltration with partial infiltration of artery
- 4 Infiltration of nerves and artery
- 5 Para arterial infiltration tuberculoid or lymphocytic the nerve fibres being absent perhaps owing to destruction

The term para arterial neural infiltration is applied to the first three more especially to the second and third of these phases Examining sections of tissues the author found this infiltration in 37 out of 50 cases Of the other 13 five showed neuritis but there were no arteries in the field and in eight the nerves could not be identified He sums up by saying that in tuberculoid leprosy the infiltration has a peculiar and characteristic distribution starting around the nerve fibres displacing but not invading the vascular structures— para arterial neural infiltration —a condition which is not found in non leprous granulomata
H Harold Scott

SCHUJMAN (Salomon) & VACCARO (Agustin) Las adenopatías leprosas Estudio clínico histológico y bacteriológico comparativo de los ganglios en las formas lepromatosas y neural tuberculoides [Adenopathy in Leprosy]—*Rev Argentina de Dermatosisifilologia* 1942 Vol 26 Pt 4 pp 925-940 With 6 figs [15 refs] English summary

The authors have made a study of the gland changes—clinical bacteriological and histological—in 150 cases of the lepromatous form and 50 of the neural tuberculoid form of leprosy The bacteriological examination was made in 80 and the histological in 25 cases They also inoculated guinea-pigs subcutaneously and intraperitoneally with emulsions of the glands in 50 cases but all with negative results Clinically the order of frequency of involvement was axillary, inguinal, cervical and epitrochlear They were never suppurating they varied in size from a lentil to a small nut largest and most numerous at the time of a leprous reaction Bacteriologically 0 positive of those examined by biopsy three were positive and all were in a state of tuberculoid reaction Histologically there is nothing fresh recorded

They found enlargement of the glands was much more common in the lepromatous cases (96 per cent) whereas in the tuberculoid forms it was present in 60 per cent only and most of these at the time of a reaction. In both the glands are non suppurating painless covered by normal skin and not adherent (but in two of the lepromatous there was chronic suppuration with fistulae). There seems to be no relation between the severity, number and extent of the skin lesions and enlargement of the glands draining the area. *H Harold Scott*

DHARMENDRA. Studies of the Lepromin Test (9) A Bacillary Antigen standardised by Wei hl.—*Leprosy in India* 1942 Oct Vol 14 No 4 pp 122-129

This paper records a further advance in obtaining a standardized lepromin for the Mitsuda test. The suspensions hitherto made from leprosy nodules contained some tissue elements as well as the lepra bacilli. The latter have now been obtained in a pure form by the following method. Material from a leproma (usually from the ear) is sterilized in the autoclave and then ground in a mortar in chloroform using 50 cc to 2 grammes of lepromatous tissue. The chloroform is pipetted off and the process is repeated until a smear of the remaining tissue is almost free from bacilli and on evaporating the chloroform on a water bath only bacilli and lipoids remain. This residue is then suspended in ether and centrifuged to remove the lipoids and the deposited bacilli are separated and dried in a vacuum. They will be found to have retained their antigenic property. This is strongest when the powdered bacilli are further treated with chloroform for four days in a refrigerator. Standard lepromin is prepared by suspending 1 mgm of the dried bacterial powder in 10 cc of carbol-saline and the routine dose for the test is 0.1 cc of this (containing 0.01 mgm of the bacterial powder) which can be conveniently kept in 1 mm or 0.1 mm quantities in sealed ampoules from which fresh suspensions can be made.

With this antigen the early reactions are stronger and the late ones considerably weaker than with ordinary lepromin which are advantages. In the vast majority of neural cases reactions are obtained and in the vast majority of lepromatous ones no early or late reactions are produced. *L Roers*

PAN (C S) A Clinical Evaluation of the Lepromin Test —*Arch Dermat & Syph* 1942 Dec. Vol. 46 No 6 pp 792-795

The author first refers to the original work of MITSUDA in introducing the test now known by his name or more commonly as the lepromin test and he mentions some later observations but these do not include those of LOWE and his colleagues in Calcutta. He goes on to report on his own studies in Shan hai among different types of leprosy and in 10 contacts and 24 controls. 9 of the 10 contacts and 20 of the 24 controls gave positive results. On the other hand only 1 of 37 (? 5 per cent) of cutaneous cases and none of 11 mixed ones gave a positive reaction. 17 of 21 neural and all 7 tuberculoid ones reacted. In 27 leprosy cases as well as in all the contacts and controls the Mantoux tuberculin test was also carried out but the two reactions were only in agreement in five of the leprosy cases. Histological investigations showed giant-cell formation such as results from reactions to a foreign body.

The author concludes that he is in agreement with other observers that the lepromin test does not serve well as a diagnostic procedure in leprosy
L Rogers

ALBARRACÍN (Leopoldo) Algunas consideraciones sobre la medicación antileprosa por el aceite de *hydnocarpus* y sus esteres etílicos [The Treatment of Leprosy by Oil of *Chaulmoogra* and its Ethyl Esters]—*Bol Inst Nac de Hig Sanper Martine* Bogota 1943 Jan No 10 pp 9-27

A good general account of the treatment of leprosy by *chaulmoogra*. The author gives a brief description of the oil and its extraction the possibilities of adulteration the preparation and purification of the esters the dosage the need for treating concomitant conditions such as helminthic infestations syphilis and tuberculosis if the best effect is to be obtained from the specific drug. The whole is a sort of review article interestingly written but bringing forward no facts not already known to readers of this *Bulletin*
H Harold Scott

HELMINTHIASIS

SCOTT (J Allen) The Natural Pattern of Dilution Counts of Helminth Eggs—*4mer Jl Trop Med* 1942 Nov Vol 22 No 6 pp 647-654 With 4 figs

The permanent value of dilution counts has been questioned in recent years but workers have used the method in very different fields of work for instance the public health official favours it because it gives him an adequate conception of the level of infection in a community the clinician finds it very erratic in individual cases the experimentalist obtains good results only when he makes multiple observations which reduce the fluctuations of random error and he may not realize that in surveys this variation is compensated by the fact that the distribution of observations from a natural population follows a definite pattern. There is also a great diversity in the methods used for presenting the data so that the work of different authors cannot be compared.

Limiting his discussion to the use of Stoll and Hausheer's dilution method the author shows that egg count data (counts of eggs of *Ascaris* and hookworms are illustrated) from a natural human population group

form a J shaped curve as ordinarily plotted since most persons pass small numbers of eggs while relatively few pass very many. When the data are plotted on a logarithmic scale an approximate normal curve results only when the average is unusually high and the number of cases lost below the lower counting limit is therefore unappreciable. Data presented here demonstrate that most averages of egg counts have been unequally biased by the variable size of this missing portion of the curve. Statistical analysis of the data on a logarithmic scale requires no special mathematical knowledge and offers certain definite advantages. The resulting constants although expressed in compact form provide material for such additional analyses and comparisons as the reader may wish to make. In addition visualization of the data is easier on a logarithmic scale.

Scott will publish later an account of practical methods of handling egg counts in accordance with the theoretical principles here discussed
G. Laba e

SENPA (Juvencal) & FELICIANO (Olavo) Contribuição ao estudo das parasitoses humanas em Belo Horizonte [Parasitism in Children (in an Institution) in Belo Horizonte]—*Brasil Medico* 1942. Dec 3 & 12. Vol 26 Nos 49 & 50 pp 347-349 [10 refs.]

The institution in question the Casa do Pequeno Jornaleiro has 250 inmates but of 92 only were the faeces examined for helminth parasites. Bearing in mind how small the total is we nevertheless find results of considerable importance. The method employed was the sedimentation technique of Hoffmann Pons and Janner after the supernatant fluid had been decanted the deposit was again washed and again allowed to settle for at least 30 minutes and then spread on three slides, the material being again washed and sedimented from the first to provide for the second examination.

Of the 92 four only were negative and of the 88 positive 14 harboured one species only 35 two 27 three 9 four and 3 five species. The authors findings of the different helminths are given in a Table as percentages and in the same Table are the findings in seven other investigations between 1937 and 1942. The authors found *Necator americanus* the commonest (28 per cent) *Trichuris trichiura* next (33.2 per cent) *Schistosoma mansoni* in 46.7 *Ascaris lumbricoides* in 39.1 *Strongyloides stercoralis* in 25 *Encyrtus vermicularis* and *Taenia* sp each 1.66 per cent. The figures are given by the authors in percentages presumably in order that they may be compared with the seven other series where they are similarly stated. The actual figures among the 92 cases examined would be 67 49 43 36 23 and 1 respectively.
H. Harold Scott

CAMPBELL BEGG (R.) Why is Bilharzial Disease so frequently undiagnosed?—Reprinted from *Leech* 1942. Vol 13 No 2 pp 7-9

The author discusses a common form of bilharzia which often remain undiagnosed for years because the symptoms are obscure and are not generally known to be associated with bilharzia.

Three cases are described all of them seen on one afternoon they are selected from some 100 others.

Case 1 a male aged 27 complained of disabling pain in the left inguinal region without urinary symptoms except slight tingling at the end of the penis when micturating. He had acquired schistosomiasis at the age of 16 and had been given 40 injections. No eggs were then found in the urine and he was pronounced cured. But he had not felt well since and had often had to give up work because of disabling pain in the lower abdomen. Examination revealed marked tenderness along the line of the ureter in the left inguinal region. The urine was normal. Cystoscopy showed several patches of active bilharzia. The lower 15 cm of each ureter were sticky to the passage of catheters but there was no stricture. The diagnosis was active schistosomiasis in and around the bladder and lower part of the ureters.

Case 2 a male aged 29 complained of abdominal pain frequent micturition day and night and inability to work. At the age of 23 he had seen a little blood in the urine on one day but no eggs of

Schistosoma were found and he was told it was not due to schistosomiasis. A year or so later the present symptoms began. Examination showed tenderness in the suprapubic region and along both ureters and over the right superior lumbar trigone. The urine was normal without eggs of *Schistosoma*. Cystoscopy showed fresh and old standing patches of schistosomiasis scattered over the bladder. The ureters were sticky to catheters but were without strictures. The diagnosis was as for Case 1.

Case 3 a female aged 31 married complained of aching spasmodic pain in the back and right inguinal region. She married at the age of 21 and during that year when she was 4 months pregnant she had severe right renal colic which remained throughout pregnancy and ended when a 7 months child was born. But it persisted and four years later when she was again pregnant the renal colic returned. There was a premature birth and the child died. Her troubles persisted for the next six years. Pyelitis was diagnosed but no eggs of *Schistosoma* were found in the urine. Examination showed tenderness in the right renal region and along the right ureter. The urine was normal without eggs. Cystoscopy showed very obvious schistosomiasis of the bladder.

A large number of similar cases have led the author to the following conclusions: (1) The presence of *Schistosoma* cannot be excluded even if the patient has not lived in areas known to be infested or has not paddled or bathed in ponds or rivers. (2) The first infestation may cause no symptoms. (3) The absence of eggs of *Schistosoma* from the urine is no proof of the absence of the infestation. In most cases except at the very onset of the attack no eggs will be found in the urine. Even if eggs are passed from time to time the chances are remote that the urine will be examined at one of these times. Repeated examinations of the urine of patients being treated while the disease is very active may reveal no eggs so that this test is completely misleading as a test of cure. In only 3 per cent of the author's cases which were proved by cystoscopy to have active schistosomiasis were eggs found in the urine. In most of them the urine was clear and centrifugation produced no deposit. (4) Increase of eosinophils is more valuable than examination of the urine for eggs in fairly recent cases but a fairly normal count of them occurs during the active disease. (5) The typical picture obtained by radiology of very advanced or neglected cases with dilatation above strictures in the lower ureter, calcification and enormous hydronephrosis is seen only in a minority of cases. Active schistosomiasis may go on for years without any such strictures and with normal intravenous pyelograms. The same may be true when strictures with a calibre of No. 4 F or more are present. (6) Cystoscopy shows that most cases do not show ulceration of the granulomata. Usually there are papular formations singly or in groups. The eggs are in the submucosa and the site can usually be detected by the cystoscope. Cystoscopy is the only means of confirmation or exclusion of the disease and the only valid test of cure. It is almost infallible.

It cannot be sufficiently emphasized that when the disease is active urinary dysfunction may be absent or minimal and the only symptoms may be lassitude ill health with or without abdominal pain and usually tenderness in the region of the kidneys or ureters. When all the parasites are dead the sequelae of the disease are more or less dense strictures of the ureters usually in the first 10-12 cm above the

bladder. They produce disabling pain along the course of the ureters. In the author's experience there is a predilection for the right side and the right inguinal region. The maximum point of tenderness is the point often wrongly taught as McBurney's point and this leads to diagnosis and operation for appendicitis. South African practitioners are not sufficiently bilharzia-conscious. The disease is the commonest cause of right inguinal pain in South Africa and is the peculiar plague of that country.

The junction of the middle and outer thirds of the line between the anterior superior iliac spine and the umbilicus lies exactly over the lowest accessible part of the ureter where it turns over the external iliac artery to descend into the pelvis. Tenderness over this point indicates ureteral pathology and in South Africa the commonest ureteral lesions are due to schistosomiasis or to strictures following it. The junction of the appendix and the caecum is $\frac{1}{2}$ inch more lateral than this point as McBurney emphasized. *G. Lapa*

BLUM (Benjamin B.) & LILGA (Harris V.) Schistosomiasis Infection. Report of Two Cases found in Northern Michigan.—*Jl Amer Med Assoc* 1943 Jan 9 Vol 121 No 2 pp 125-126 With 1 fig

Two cases of infestation with *Schistosoma haematobium* in Northern Michigan are recorded and the authors point out that conditions associated with the war may introduce into the United States and Canada diseases which are endemic in other countries. Most of the cases reported in the United States have been well advanced and diagnosed relatively late and the authors know of no cases which have been diagnosed before the onset of symptoms.

Case 1 was a white boy aged 9 complaining of bloody urine for the last three months and enuresis for two days. He said the blood had appeared at the end of urination every three or four days until it had occurred daily during the week before he was seen. His health in other respects was good. He had been born in South Africa in a region where many rivers were infested with snails.

The boy's only physical abnormality was slight tenderness in the right renal area. The haemoglobin value was 81 per cent (13.4 gm) with an erythrocyte count of 4,100,000. Eosinophilia as high as 11 per cent was found. The urine was normal except for the terminal drops in which numerous pus cells and erythrocytes and *Staphylococcus aureus* were found. He was treated with sulphathiazole and in two weeks the pyuria had disappeared and urine cultures were negative but the terminal bleeding persisted. Repeated searches revealed four weeks after the patient was first seen one egg of *Schistosoma haematobium*. Urine and faecal examinations of the parents, two sisters and one brother were negative.

Case 2 the 12 year old brother of the last showed eggs of *Schistosoma* in the urine although he had had no symptoms and terminal haematuria appeared thirteen days after these were found. His haemoglobin value was 77 per cent (12.8 gm) with 3,780,000 erythrocytes and 20 per cent of eosinophils. The urine contained blood, pus, eggs of *S. haematobium* and *Staphylococcus aureus*.

Both patients were treated with foudrin. No local or systemic reactions followed. After removal of the family to another part of Michigan the younger boy again showed eggs in the urine and was

given a second course of foudadm The mother reported that there has not been any recurrence up to September 1942

As it is believed that there is no suitable intermediate host in the United States there is little reason to fear the occurrence of cases other than those brought in to that country *G Lapage*

SCOTT (J Allen) La epidemiologia de la schistosomiasis en Venezuela [The Epidemiology of Schistosomiasis in Venezuela]—*Rev Sanidad y Asistencia Social Caracas* 1942 Dec Vol 7 No 6 pp 771-809 With 2 figs

This is a translation of the paper abstracted in this *Bulletin* 1942 Vol 39 p 865

CAWSTON (F Gordon) Safeguarding Schoolchildren from Schistosomiasis—Reprinted from *Clin Proc* 1942 Sept Vol 1 No 9 pp 311-314 With 1 fig

A school boy aged 14 complaining of painless haematuria had been swimming in a Natal waterfall believed to be free from *Schistosoma* and water snails but his urine contained eggs typical of *S haematobium*

During two weeks he was given 29 cc of anthiomaline in 11 doses and the eggs disappeared for a time from the urine The total dose during 23 days was 45 cc An earlier case a man aged 20 was permanently cured in 1936 by a total dose of 40 cc of anthiomaline given during 20 days Repeated doses of 3-4 cc of anthiomaline are preferable to smaller ones spread over a longer time and anthiomaline is less irritating and more potent than tartar emetic

Among school-children most of the parasites are males or immature worms causing slight enlargement of the liver and an increase of eosinophils Eggs tend to stay in the bladder till the last portion of urine is passed Complete eradication of the parasite is essential The author thinks that large numbers of successfully destroyed worms increase acquired powers of resistance to the parasite

Physopsis africana was found in the mud above the waterfall in which the patient bathed and there were well frequented native paths to the water there The European owner had had bilharzia This snail was the only one which survived oiling of the pools and the other anti mosquito measures in other localities but these measures kill its natural enemies and so favour its multiplication Forcible disturbance of water by pumping destroys many larvae infestation being most often acquired in still shallow water The only effective method of destroying the snails is the removal of all vegetation from the water ways liming the soil and prevention of human fouling of the water Ducks feed greedily on *P africana* but neither these nor the hedgehog can eradicate it completely *G Lapage*

BONNE (C) Researches on Sparganosis in the Netherlands East Indies—*Amer J Trop Med* 1942 Nov Vol 22 No 6 pp 643-645

Sparganosis is rare in man in the Malay archipelago VON RÖMER (*Arch f Schiffs u Trop Hyg* 1910 Vol 14 p 289) found a sparganum in the bladder of one man and Bonne found one in the pulmonary artery of a Malay—*a very unusual habitat* DE HARTOGH found

that *pargana* is very common in frog near Batavia the corresponding tape worm (species of *Diphyllbothrium*) being found in cats and less often in dog. He infested them with the *Diphyllbothrium ranarum* (named by Faust) by feeding them with the frog JOYET and BAER (the Bulletin 1930 Vol 27 p 964) fed rats and guinea pig with *pargana* of frogs and these unsuitable hosts acquired not intestinal infestations with *Diphyllbothrium* but re-encapsulation of the *pargana* in sparganosis of the dorsal muscles of the abdomen and other situations. The *pargana* occasionally in monkey and MEYER found them occasionally in pigs. MEYER fed cats with *pargana* from pigs and the cats acquired infestations with tape worms diagnosed as *D. ranarum* and *D. erinacei* by different zoologists. These may have been *D. ranarum*. BONNE and LIE HAN found two *pargana* in the wall of the small intestine of a Malayan man. A kitten was fed with these and acquired tape worms deposited *in vitro* by *Diphyllbothrium*.

GAN KOEN HAN obtained egg deposited *in vitro* by *Diphyllbothrium* and acquired tape worms developed as demonstrated by SANDGROUN. These hatched in about 20 days at room temperature. A local species of *Cyclops* as very susceptible to the ciliated coracidia. In 4-9 days the procercoid larvae in the *Cyclops* developed the infestation per thro in off after 20-32 days. Poor results followed the infestation per os and intraperitoneally of frogs and toads were very easily infested with them. Out of 161 frog tadpoles 44 were infested by placing them in a dish with infested *Cyclops*. The *pargana* in the tadpoles were much smaller than those in adult frogs when they were given coracidia remained uninfested. The *pargana* in the tadpoles were in food to eat they required a longer time to develop into *Diphyllbothrium* than did *pargana* from adult frogs. It thus seems that in nature infestation of frog occurs partly at any rate in the tadpole stage but Gan Koen Han did not discover any naturally infested tadpoles.

Cyclops infested with post-cercarial stage given per os or otherwise to monkeys and mice produced sparganosis in these. Probably man like the monkey may acquire sparganosis by ingesting *pargana* or *Cyclops* containing fully developed procercoids. *D. ranarum* is common in cats and less so in dogs in the Netherlands. East Indies the *pargana* frequent in frog less so in toads and a local *Cyclops* acts as the intermediate host. G. Lafont

CAMPBELL (DAN H.) Experimental Eosinophilia with Keratin from *Asearis sum* and other Sources.—*Jl Infect D* 194 No 1—Dec Vol 71 No 3 pp 70-76 With 1 fig

DE MEILLON (Botha) & GILLESPIE (J C) Note on a Human Eye Worm.—*South African Med Jl* 1943 Jan 9 Vol 17 No 1 Pp 5-6 With 2 figs

The author describe one case of infestation of the eye with a nematode which could not be exactly identified because only one female was recovered. This appeared to resemble *Filaria conjunctivae* Addario 1885 more closely than any other species. So far as the authors know the infestation has not been recorded before in South Africa.

The patient a woman had travelled extensively in Central Africa since 1928 (Belgian Congo Uganda Kenya) In 1937 she developed urticaria which recurred at intervals up to the date of her examination but the authors are not sure that this was due to the nematode In May 1942 a swelling appeared on the ventral proximal third of the forearm this disappeared soon after and another appeared near the base of the forearm no others were seen but a week after the last swelling had gone the right side of the face became swollen red and painful and while this condition lasted the worm appeared in the lower conjunctiva of the right eye The worm was alive and moving about it eventually disappeared from the orbit but reappeared It was then seen just above the lower fornix of the right eye There was some swelling and redness of the lower conjunctiva and eyelid The worm loop was fixed in forceps under cocaine anaesthesia and with its covering tissues tied with a silk suture Pieces of the worm which was active were then dissected out about 4½ inches of it were removed The following measurements are given with the illustrations total length 115 mm width at the middle 0.5 mm length of the oesophagus 1.0 mm the nerve ring was 0.28 mm and the vulva 2.2 mm from the anterior end The anus was subterminal the vagina which had no anterior loop contained large numbers of what appeared to be eggs but no embryos were seen The cuticle was very finely striated transversely The oesophagus was straight and without a basal bulb Cephalic papillae were seen but their position and number could not be made out Examination of the blood by Knott's concentration method [this *Bulletin* 1940 Vol 37 p 304] on both day and night blood as well as other examinations of day and night blood failed to reveal any microfilariae Blood smears showed no abnormality of the red cells and no eosinophilia G Lapage

SCHENKEN (John R) & MOSS (Emma S) *Enterobius Vermicularis* in the Appendix Report of a Study on 1,000 Surgically Removed Appendices—*Amer J Clin Path* 1942 Oct Vol 12 No 10 pp 509-517 With 6 charts [17 refs]

The authors examined 1 000 appendices removed from patients in the Charity Hospital at New Orleans The first 600 were examined by a single centrifugation of the contents of the appendices (Group 1) the remaining 400 by repeated centrifugation until the supernatant fluid was clear (Group 2) The results show the greater efficiency of the latter method Earlier American workers quoted have not stated their methods or have relied on gross examination of the contents or on examination of sections neither of which is efficient Their records of the incidence of *E. vermicularis* in the appendix vary from 1 per cent to 18.2 per cent this variation is due the authors suggest to variation in the efficiency of the methods used rather than to the geographical distribution of the parasite The small males are easily overlooked Probably the female rarely lays eggs in the appendix On slides changes of temperature and rapid drying caused rapid discharge of eggs and the authors suggest that similar physical factors determine egg laying on the peritoneum

Of the 1 000 appendices examined 23.3 per cent were infested The greater efficiency of repeated centrifugation (Group 2) is shown by the results The incidence in white women was 42.1 per cent in Group 2 and 27 per cent in Group 1 (single centrifugation) in white males

[July 1943]

38.3 per cent in Group 2 and 16.3 per cent in Group 1 in negro women 12.8 per cent in Group 2 and 6.3 per cent in Group 1 in negro men 12.8 per cent in Group 2 and 7.7 per cent in Group 1. Of the 680 white patients 206 were infested (30.3 per cent). Of the 370 negro patients 27 were infested (8.4 per cent). The preponderance of the parasite in whites was thus considerable. The preponderance of the eggs of *Trichuris trichiura* *Necator americanus* *Strongyloides stercoralis* *Hymenolepis nana* and *Taenia* sp. was also marked but eggs of *Ascaris lumbricoides* were about equally numerous in both whites and negroes. Other workers have recorded the preponderance of *E. vermicularis* in the appendices of females rather than in males. Schenken and Moss found this difference significant only when the total white patients were considered. In Group 2 the improved technique revealed only a small difference between the incidences in male and female whites (females 47.1 per cent males 38.3 per cent). In negroes the difference was also small but it was reversed (12.8 per cent in males and 10.1 per cent in females). The figures indicated that 60.5 per cent of 206 infested white patients were 10-19 years old the highest incidence (72.4 per cent) was among white females aged 5-9 years. In negroes the highest incidence (17.6 per cent) was in males aged 10-19 years the next highest being 13.6 per cent in females aged 10-19 years. G. Lapa

LEVIN (A. J.) & EVANS (T. C.) The Use of Roentgen Radiation in locating an Origin of Host Resistance to *Trichinella spiralis* Infections.—*Jl Parasitology* 1942 Dec Vol 28 No 6 pp 477-493 20 refs

Earlier workers have shown that roentgen or radium irradiation will inhibit the reproductive activity of *Trichinella spiralis* and that the doses of roentgen rays can be so adjusted that the intestinal phase of the parasite develops normally but reproduction cannot take place. The present authors confirmed this working out the necessary doses. They now find that in rats fed with larvae exposed to 3250-3500 or 3750 Roentgen the intestinal phase of *T. spiralis* develops but no larvae are produced. The development of a second infestation of the same rats does not induce a resistance which prevents a second infestation in the host's intestine. The authors conclude that the resistance induced by other methods have come to the conclusion that the resistance is localized in the intestine. This view is contrasted with the view of other authors quoted who believe that the initial infestation induces a general immune response with the production of antibodies. Levin and Evans suggest that roentgen rays are a tool which could be used for the study of host resistance to infestations with other helminths. WAXLER and HERRICK [Supp to *Jl Parasitology* 1941 Vol 17 p 17] have immunized chickens to coccidiosis by feeding them with irradiated oocysts. Levin and Evans think that technical difficulties need not prevent the feeding of young pigs with irradiated larvae of *T. spiralis* so that they could develop resistance to trichinosis with the result that human trichinosis might be eradicated but the behaviour of irradiated larvae in the pig would have to be studied first [cf STOWERS this Bulletin 1943 Vol 40 p 403]. G. Lapa

DEFICIENCY DISEASES

VEDDER (Edward B) A Study of the Deficiencies of Polished Rice
In Relation to Beriberi—*Amer J Trop Med* 1943 Jan
Vol 23 No 1 pp 43-47

The deficiencies associated with a diet mainly of polished rice are not made good in the tropics by the limited amount of fish and vegetables taken. We are inclined to regard polished rice as deficient in thiamin and to ignore or at least gloss over other deficiencies such as its being low in fat and fat soluble vitamins in mineral salts and protein. ALKROLD and his fellow workers have shown that typical rice diets have an inadequate content of vitamin A, the B complex and calcium. The author has carried out an interesting experiment of feeding 50 rats on a diet of polished rice and adding various synthetic constituents of vitamin B as indications arose, noting the time when these occurred and the results of the additions.

The rats were given a normal diet for six days to ensure their being healthy and normal. They were then put on a diet of polished rice with thiamin 10 microgrammes daily, but none of the vitamin B₂ complex. The rats did not grow at all on this diet. Fat soluble vitamins were then added and a slight increase in weight resulted. On the 25th day dermatitis and patchy alopecia were observed and relieved by pyridoxin (vitamin B₆) but there was no further growth until riboflavin was added. By the 55th day growth had again declined and signs of deficiency of pantothenic acid appears (bloody whiskers the naso lachrymal duct). Fifty microgrammes of calcium pantothenate were added daily and the symptom disappeared and growth was resumed. On the 67th day there were signs of anaemia and Fe deficiency so Osborne and Mendel's salt mixture was added. Thirty three days later there was ruffling of the fur remedied by adding 20 mgm of choline daily and growth progressed well for a time. On its again declining p-aminobenzoic acid and inositol contained in yeast were added but the growth remained unchanged.

In the discussion the author states that except for very short periods growth was never adequate, perhaps biotin or other synthetic component of the vitamin B complex was lacking. Also the long deficiency seemed to lead to some more lasting injury for growth was not satisfactory even when the animals were given normal diet at the end of the experiment.

Vitamin A lack is a subsidiary cause of peripheral nerve degeneration (subsidiary that is to thiamin) and vitamin E deficiency leads to degeneration of the skeletal muscles. It may be that the advanced muscular degeneration of dry beriberi is in fact due to avitaminosis E. The author sums up his conclusions in the following words—

- 1 Polished rice is known to be deficient in thiamine (B₁)
- 2 Polished rice is also known to be deficient in the fat soluble vitamins A, D and E
- 3 Polished rice is also deficient in inorganic salts particularly calcium and iron
- 4 Polished rice has been shown in these experiments to be deficient in the following vitamins of the B complex: pyridoxin (B₆), riboflavin, pantothenic acid and choline

5 The clinical picture of dry beriberi as it occurs on a rice diet with its nerve and cord degeneration and muscular atrophy is caused by a complicated vitamin deficiency including at least all of the above vitamins
H Harold Scott

WILLIAMS (Ray D) MASON (Harold L) POWER (Marschelle H) & WILDES (Russell M) Induced Thiamine (Vitamin B₁) Deficiency in Man Relation of Depletion of Thiamine to Development of Biochemical Defect and of Polyneuropathy—*Arch Intern Med* 1943 Jan Vol 71 No 1 pp 38-53 With 4 figs [Refs in footnotes]

This records the fourth of a series of studies from the Mayo Clinic of the effects of diets containing a restricted amount of thiamin but otherwise ample. The level of restriction in this case was planned to be intermediate between those of previous experiments and two women volunteers were given a diet that provided only 0.1 mgm of thiamin per thousand calories. Every two weeks a test dose of 1.0 mgm of thiamin hydrochloride was administered subcutaneously so that the average daily intake was raised to 0.175 mgm thiamin per thousand calories.

As a result of several years work the authors consider that determination of the percentages of pyruvic acid, lactic acid and glucose in the blood after oral or intravenous administration of glucose appear to give the most reliable tests for the estimation of the probable severity of the metabolic defect in states of uncomplicated thiamin deficiency. They use this metabolic load test here but point out that it is not specific for nor pathognomonic of thiamin deficiency.

The fortnightly dose of 1.0 mgm of thiamin served not only as a test dose for urinary excretion but also as a partial periodic cure allowing the experiment to continue for a much longer period because of the improvement of appetite and activity for some days after each injection.

Symptoms and signs of deficiency appeared by the thirtieth day of restriction when a decrease of the ordinary urinary excretion of thiamin was recorded. Twenty days later urinary excretion of thiamin after a test dose was reduced. From this time abnormally high values for pyruvic acid and lactic acid were found in the blood after giving glucose. About this time also anorexia and weakness became more marked and the subjects complained of paraesthesia of the legs. Clear evidence of nervous damage was present after 110 days and consisted of defects of sensation, loss of tendon reflexes and paralysis of the muscles in the legs.

The experiment was stopped after 120 days because one subject had a severe neurological defect and the other less severe defects and because the appetites of both had failed and inanition seemed imminent. The administration of large doses of thiamin largely cured the biochemical defect within a week and the appetite and strength returned rapidly. The neurological defects however responded much more slowly and in one subject were incompletely restored after four months of continuous treatment.

Experimentally polyneuropathy has been a manifestation of late severe deficiency of thiamin and the anatomical defect has been only slowly reversible even when thiamin hydrochloride has been administered intensively.
H E Hardin

GOLDSMITH (Grace A.) The Incidence and Recognition of Riboflavin and Niacin Deficiency in Medical Diseases—*Southern Med J* 1943 Feb Vol 36 No 2 pp 108-116 [20 refs]

A previous survey in New Orleans covering 5776 adolescents in schools demonstrated a marked lack of good nutrition. Good nutrition was found in only 11.2 per cent of white and 3.3 per cent coloured individuals. fairly good nutrition in 59.6 per cent white and 38.1 per cent coloured. deficient nutrition in 29.2 white and 58.6 coloured.

In Louisiana among farming families the figures were 1.22 good 69.28 fair and 29.49 deficient nutrition.

It is believed that any organic or functional disturbance leading to poor absorption, improper utilization, increased excretion or increased requirement may produce vitamin deficiency syndrome.

Using clinical criteria suggested by the Subcommittee on Medical Nutrition Division of the Medical Sciences National Research Council, an examination of 200 patients admitted to the Charity Hospital, New Orleans, and aged 5 to 82 years was made for signs and symptoms believed to be due to deficiencies of riboflavin or nicotinic acid, which the Americans now call niacin. Forty per cent of those examined exhibited what was considered to be definite evidence, and 67 per cent probable evidence of deficiency of riboflavin or of nicotinic acid or both. Most of the cases occurred among those suffering from gastrointestinal disease, arteriosclerosis, cardiac and malignant disease.

[The possibility of detecting minor vitamin deficiencies is a subject of considerable interest; the recognition of certain well marked syndromes may present little difficulty, but the interpretation of the same syndromes when incomplete, or of individual signs or symptoms may be a matter fraught with difficulties, perhaps not always recognized except by those who have carried out wide observations. The author has recognized this in regard to circumcorneal vascular injection, but the same is true of other signs. Much observation and correlation with experimental investigations is still required before any very certain pronouncement can be made.] H. S. Stannus

MACHELLA (Thomas E.) & McDONALD (P. Robb) Studies of the Vitamins in the Human Subject. VI. Failure of Riboflavin Therapy in Patients with the Accepted Picture of Riboflavin Deficiency—*Amer J Med Sci* 1943 Feb Vol 205 No 2 pp 214-223 [27 refs]

Certain subjective and objective clinical disturbances have been reported to disappear when the vitamin is administered, a syndrome to which the name Ariboflavinosis has appeared in medical literature as a result. The authors review the literature on the subject and summarize personal experiences in the treatment with riboflavin of some of the lesions attributed to its deficiency. The clinical phenomena discussed include (1) cheilosis, (2) the seborrhoeic type of dermatitis, (3) vascularizing keratitis, (4) the specific form of glossitis, (5) pemphigus, and the authors show how considerable has been the lack of close agreement among various writers upon a number of points. Their own material consists of 20 subjects, of these three had more than one lesion, one had (1), (3) and (4), two had (1) and (4), nine had (3), five had (1), six had (4), four had (5).

Test treatment continued in the administration of riboflavin 2 mgm thrice daily for one or two weeks with increased doses subsequently in some cases and 1 cc dilute hydrochloric acid at meal to those with achlorhydria. It was shown that the riboflavin was an active preparation and by testing the urine that it was absorbed. In only a single case was some subjective improvement noted. Later all the lip and tongue condition cleared up with brewer's yeast. *H S Stannus*

VENOMS AND ANTIVENENES

SCHOTTLER (W H A) Untersuchungen ueber Toxikologie und Serologie der europaischen Ophiotoxine [Study of the Toxicology and Serology of European Snake-Venoms]—*Ztschr f Hyg u Infektionskr* 1942, Sept 26 Vol 124 No 2, pp 141-163 [32 refs.]

The author starts by saying that there are certain analogies between bacteria and snake venoms in that both are toxic and both have antigenic structure. [This seems to be too broad a statement to lead to anything of value and among his conclusions the author states that a uniform method of testing venoms and sera on the lines usual in bacterial investigations is not yet available]. He tested the venoms of 32 viperine snakes including several specimens of *L ammodytes L aspis* *L berus* *L letiscus* *L rousin* *L latas* and *Aescrodon kaly*s captured in their natural haunts using mice as his experimental animals and several specific monovalent and polyvalent antivenenes. He estimated the M.L.D. (the smallest amount of toxin per 10 gm mouse which would cause death) the M.T.D. (minimum tolerated dose i.e. the largest amount the animal can receive and recover from) and the C.L.D. (the smallest quantity which will kill all the mice in an experiment). He found quite marked differences in the constitution of the toxin and its antigenic structure even in specimens of a single species captured in the same place at the same time various species contained several antigenic constituents in common. Antivenenes on the market differed to no small extent in their neutralizing potency the best—though even that was far from satisfactory—being the anti viperine serum from the Zagreb Institute of Hygiene. Against the venoms of snakes of Albania Switzerland East Prussia and Esthonia no antivenenes are prepared a matter which it would be well to remedy. *H Harold Scott*

KACER (George L.) Jr BIRD (Robert M) & REZNIKOFF (Paul) The Clotting Action of Fer-de-Lance Venom—*Amer J Med Sci* 1943 Jan Vol 205 No 1 pp 16-24 With 2 figs. [11 ref.]

EAGLE has found that the venom of *Both ops atrox* (Fer-de-lance) has an enzyme action converting prothrombin to thrombin and fibrinogen to fibrin. It also contains powerful haemorrhagins and neurotoxin which restrict its use as a coagulant. A detoxified (but not

non toxic) product was obtained in 1939 which clotted well but whose haemolytic and neurotoxic effects were reduced. A study has been made of this product to determine its use in haemorrhagic conditions comparing it with stock venom i.e. the crude dried venom. The detoxified venom was prepared by shaking a 1 per cent solution of the stock venom for 18 hours with an equal volume of chloroform and evaporating the supernatant fluid.

First *in vitro* experiments on the clotting effect of the venom on whole blood were made using serial dilutions of the stock and the detoxified venoms and oxalated and heparinized blood. The stock proved a more rapid coagulant than the detoxified and oxalated blood coagulated more rapidly than did heparinized blood. The effect of adding venom to a clear dilute fibrinogen solution was the formation of a cloudy gel like fibrin clot which lyses at a rate dependent on the concentration of venom.

In vivo experiments were performed on white rabbits and small dogs. In the former no change in clotting time was observed nor did local haemorrhage occur after subcutaneous injection of even 0.1 cc of 1 per cent detoxified venom. Intravenous injection into rabbits caused an increase in coagulation time with a decrease in fibrinogen, so dogs were then used as experimental animals. After injection of 1-2 cc of 1 per cent venom stock or detoxified the dogs were gasping and vomiting and showed relaxation of sphincters, opisthotonus, respiratory paralysis and cardiac asystole and died in 2 to 30 minutes. Post mortem there was found engorgement of the vessels of the viscera, there were no clots in the heart or large vessels and no fibrin deposits seen microscopically. With small doses 0.1 cc of 1 per cent detoxified venom diluted to 10 cc with saline injected intravenously the dogs survived after showing only mild toxic signs and no shortening of coagulation time.

The venom thus had a marked coagulating effect *in vitro* and a marked anti-coagulating action *in vivo* indicating two factors and attempts were made to develop an antivenom which would neutralize the anti coagulating factor and one was obtained by injection into rabbits.

Injection of venom together with this antivenom resulted in the clotting time remaining within the normal range while the prothrombin and fibrinogen fell by 40 per cent. The venom given without the antivenom resulted in the clotting time being indefinitely prolonged and the prothrombin and fibrinogen fell to zero.

Other experiments were undertaken to determine the coagulant action of dog's plasma drawn after intravenous injection of venom and it appeared to be due to the contained venom.

The difference between the clotting effect of the venom of the Fer de-lance on whole blood *in vitro* and *in vivo* was very puzzling—coagulating and fibrinolytic (anti-coagulating) in the former and anti-coagulating only in the latter in dogs. This difference is not yet explained. The rabbit antivenom serum nullifies the clotting action of the venom *in vitro* and protects dogs against an intravenous injection of venom which without it would prove fatal.

H. Harold Scott

DERMATOLOGY AND FUNGOUS DISEASES

HEMPHILL (James E.) & NOOJIN (Ray O.) North American Cutaneous
Blastomycosis treated with Superficial Roentgen Therapy A
Report of Four Cases — *Amer J Roentgenology* 1942 Nov
Vol 48 No 5 pp 643-650 With 18 figs (9 coloured) [35
refs]

Superficial roentgen therapy in conjunction with medical measures stops activity within the spreading borders eliminates secondary infection and hastens regression of the chronic inflammatory reaction. The sooner roentgen therapy is started the less deforming will be the scar. It embraces all the principles of superficial roentgen therapy for inflammations and probably acts as a stimulatory agent to the local tissue resistance promoting repair through scarring. After as little as 300 r is given the entire inflammatory process ceases and the pathological picture becomes one of definite healing through fibrosis and regeneration of epithelium.

Small doses of superficial roentgen rays 100 kv constant potential 8 ma (inherent oil filtration equivalent to 3 mm Al) half value layer 3.20 mm Al measured in air without backscatter and half value layer 3.40 mm Al with backscatter were used in our cases. Ideal roentgen therapy should be a series of single treatments of 75-100 r per treatment administered at weekly or ten day interval for a total dose sufficient to produce smoothing of the borders and remove signs of activity. 1 500 r or less should be adequate. The paper details some four cases and ends on a note of caution. It is stressed that iodides and ray therapy together may be unavailing especially in deep lesions with bone involvement. The illustrations are very small. Sydney Thomson

BECKER (B J P) A Preliminary Report on Habaswein Itch — *East African Med J* 1943 Feb Vol 20 No 2 pp 49-51

The name designates a condition widely prevalent in the Northern Frontier District of Kenya. It has an indefinite periodicity and is far more common in Europeans than in Africans. The primary lesions are a type of dermatitis herpetiformis (sic) and appear anywhere on the body. Erythematous patches, papules, myriads of small vesicles arranged in groups, pustules and occasional bullae complete the picture. The lesions themselves last for three to five days and show period of relative quiescence and exacerbation. Their disappearance often leaves minute pigmented areas but the eruption is subject to constant recurrence. The secondary lesions have all the characteristics of urticaria and angioneurotic oedema. Experimental observations included the search for pathogenic micro-organisms the consideration of Tyroglyphus mites (cheese-borers) obtained from patches of grass and investigation of the action of pollens, bark dusts, soil etc. Ultimately caterpillar hairs were placed on damp skin and signs of irritation ensued with tiny vesicles developing after 12 hours. The reaction took six days to disappear. Apparently the same results were obtained from different caterpillars and no attempt is here made to identify the various species. Sydney Thomson

MISCELLANEOUS

BULLETIN DE L'INSTITUT D'HYGIÈNE DU MAROC 1941 N° 5 Vol 1
pp 79-131 — Rapport sur l'activité des Services de la Direction de la
Santé Publique et de l'Assistance pendant l'année 1941 [Public
Health Services in Morocco during 1941]

JACKSON (W P) The Airplane a Possible Means of Transmission of
Disease — *Virginia Med Monthly* 1942 Jan Vol 69 p 29
[Summary prepared for *War Medicine* Chicago]

Extensive development of aviation has two great disadvantages
its use as a destructive implement of warfare and its danger of convey-
ing infectious diseases such as cholera plague smallpox typhus
yellow fever malaria and dengue The incubation periods of these
diseases vary from two days to two weeks therefore a pilot or a
traveler can easily become infected before departure and break out
with the disease a day or so after reaching his destination During
the incubation period he can be a dangerous carrier of the disease
It has been proved that airplanes transport mosquitoes house flies
and other insects

The prevalence of insects in the cabins of aircraft depends on whether
the airdrome is on land or on water and the distance it is from shore
Mosquitoes are not disturbed by drafts of air when resting under seats
baggage compartments and the like Interior disinfection of aircraft is
insufficient because mosquitoes and other insects may find safe
harborage in the space between the outer and the inner linings of the
aircraft in the hollow wings in the space for retracted under carriage
and in various grooves and rivet holes

Fortunately up to the present time there has not been a serious
spread of disease by airplanes Findlay suggested this possibility in the
recent eastward spread of yellow fever from endemic zones in West
Africa to the Southern Sudan After the arrival at Muroc Calif of a
group of military planes from South America by way of Panama
Schlotthauer reported four cases of an acute illness produced by the
bite of an insect previously unknown to residents of the Mojave Desert
Study identified this insect as *Paratriatoma hirsutus* Barber a member
of the family of blood sucking vectors of the organisms causing American
trypanosomiasis and commonly encountered in South America
Yellow fever should be given some special consideration because of its
possible transmission not only by *Aedes aegypti* but by twenty two
other species of mosquitoes certain flies bedbugs ticks and cockroaches
Dengue is also transmitted mechanically by two types of *Aedes*
including *A. aegypti* and possibly two others so that a dengue
reservoir may be found in uninhabited jungle areas Malaria it
is said by Summons exceeds all other infectious diseases in sapping
the vitality and impeding the social industrial and political progress
of the inhabitants of many tropical countries While *Anopheles*
quadrimaculatus is thought of as the vector there are at least eight
other species of the *Anopheles* group that have different modes and
location of habitation Recent discoveries have introduced new
problems search for still unknown vectors and hosts of jungle infec-
tions methods of protecting exposed persons and precautions against
the spread of these diseases from infested centers

The author quotes Holmer who says "Once any of these become epidemic in the United States it is probable and possible that our own various insects may become conveyors or vectors of the organisms from animal to man or man to animal."

To prevent the spread of these infections the countries concerned have adopted certain general precautions: systematic destruction of mosquitoes on all airplanes; vaccination of all flying personnel and careful inspections of passengers to eliminate those who are infected. The Pan American Sanitary Code in addition to this agrees to present certificates which show where passengers have embarked and where they have deplaned and also the localities that they visited six days prior to a given embarkation. Such a certificate is not required of a passenger if his trip originated in a latitude south of 30 degrees south unless he has deplaned for more than one day north of this latitude.

For destruction of mosquitoes in aircraft to be effectual a suitable spray and insecticide (which is highly toxic to insects, innocuous to passengers, noninflammable, noncorrosive, nonstaining, stable in all climates and readily miscible with water) is essential. Water-soluble pyrethrum concentrate diluted ten to fourteen times with water immediately before spraying is commonly used. About 30 cc. of a 1% solution per thousand cubic feet (28 cubic meters) of space is sprayed by a nebulizer. The plane is sprayed about a half hour before landing and its ventilators are closed for about ten minutes after spraying. Airplanes may be fumigated and opened prior to the embarkation of passengers.

In addition to the vaccination of the flying personnel it is wise for all passengers intending to travel by air through yellow fever areas to be inoculated. Protection begins about a week after inoculation and is fully developed in about three weeks and the immunity which is effective against urban and jungle types of the disease lasts about two years. A third precaution, the medical inspection of passengers, their care and surveillance of contacts is the most difficult to carry out.

Certain special measures are adopted if plague, cholera, typhus or smallpox are encountered or suspected: (1) the aircraft is cleaned thoroughly; (2) the passengers and crew are examined; (3) any person showing symptoms of any one of these diseases is excluded; and (4) the personal effects of the personnel are inspected if necessary. If plague is found the following additional measures are used: immediate disembarkation of the sick person; surveillance of contacts and suspects for not more than six days; disinfection and disinsection of personal effects and deratization. For cholera the same measures are used as for plague except that the period of surveillance is five days and the drinking water is disinfected and the containers emptied and disinfected. In addition the unloading of fresh fish, shellfish, fruit and vegetables is banned. This is also true if the airplane has come from a cholera infested area. For typhus the measures are the same except that delousing is done and the period of surveillance is twelve days. For smallpox vaccination and surveillance for no more than fourteen days are carried out.

Commander Jackson concludes that careful regulations under the direction of thorough and competent health officers with adequate equipment and personnel may be the sum and substance of controlling a condition that has tremendous potentialities for spreading disease and death.

DAQGETT (W J) Desquamative Otitis Externa In Malta—*J Laryngology & Otology* 1942 Oct Vol 57 No 10 pp 427-446
With 2 charts & 1 fig

The author deals with a well defined condition met with in hot humid climates which he calls desquamative otitis externa. It occurs in several forms which have been classified by MORLEY as (1) acute (2) subacute (3) chronic (4) relapsing. These are but different stages of one disease.

A clear clinical picture can be seen in a patient whose symptoms have lasted for about two weeks. He complains of tenderness when the ear is pressed or moved and there is a variable amount of deafness. He loses sleep because of throbbing when he gets warm and there is a mild degree of cervical adenitis. Examination reveals a swollen tender meatus in the depths of which—usually obstructing the drum—is a soft mass of desquamated detritus consisting of epithelial scales pus cells and organisms. This cheesy mass is easily wiped away leaving a red angry and occasionally bleeding surface beneath. The drum is injected and swollen and when there is loss of surface epithelium it is not uncommon to see what appears to be an area of granulations. Differential diagnosis is between furunculosis mastoiditis and eczema.

The incidence is seasonal the disease being very common in the hot summer months and virtually disappearing in winter. Bacteriologically the chief findings are diphtheroids together with *Proteus Ps pyocyanea* or *Staph albus*. The diphtheroids however profuse are the first to disappear as a case reacts to treatment. No new light is thrown on causation—though swimming as an aetiological factor is discredited.

A series of 164 cases has been investigated in Malta and a satisfactory line of treatment evolved. It is essential to have a first class source of illumination and a forehead mirror. Treatment is based on (a) careful cleansing under direct vision (b) astringent wicks impregnated with the following solution—lead acetate gr λ Burow's Solution (Liq Aluminu Acetat) 3i Aq Menth pip 3i (c) insufflation of Brilliant Green $\frac{1}{2}$ to 1 per cent in boric acid powder.

Possible causes of disappointing reaction to treatment are discussed [This is a valuable survey of a condition which although not dangerous interferes with efficiency.] E D Dalziel Dickinson

DETINOVA (T S) [On the Biology of Mosquitoes of the Genus *Aedes*—*Med Parasit & Parasitic Dis* Moscow 1942 Vol 11 No 3 pp 44-52 [In Russian]]

The author describes the results of studies on the gonotrophic cycle of species of *Aedes* found in the vicinity of Moscow which proved to have much in common with *Anopheles*.

In all newly emerged female *Aedes* the ovaries are undeveloped their maturation proceeding at the expense of a carbohydrate and blood diet and not by utilizing food reserves within the body itself. The subsequent behaviour of the female *Aedes* is governed by gonotrophic harmony which in this genus is more perfect than in *Anopheles* whereas in the latter the ingestion of a partial blood meal results in a uniformly incomplete development of the follicles in all the egg tubes in the former it leads to a complete development of part

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of the follicles the number of developed follicles being proportional to the amount of blood taken in. This distinction is correlated with differences in the prey while *Anopheles maculipennis* attacks large mammals *Aedes* hunts small game—birds and lower mammals. It is more difficult to obtain a full meal from a mouse or bird than from a cow and therefore it is in the interest of the species that the female should be capable of laying eggs after an incomplete meal.

The lower fertility of *Aedes* as compared with that of *Anopheles maculipennis* is compensated by considerable longevity and repeated oviposition. With age the ovarian follicles of *Aedes* undergo gradual degeneration on account of which a large percentage of females caught in the autumn are sterile their ovaries being devoid of normal eggs. [See also BEKLEMISHEV above p 511 for a study of *A. maculipennis*].

DOLMATOVA (A V) [The Life-Cycle of *Phlebotomus papatasi*].—*Ved. Parasit. & Parasitic Dis.* Moscow 1942 Vol 11 No 3 pp 52-70 With 8 figs. [In Russian]

The author describes the imaginal part of the life-cycle of *Phlebotomus papatasi* investigated in Stalnad (Middle Asia). All the vital functions of the sandfly are governed by the rule of gonotrophic harmony and are correlated with the gonotrophic cycles as in the case of *Anopheles*. *P. papatasi* hibernates in the larval stage and not as an imago. The seasonal changes in its gonotrophic cycle are therefore like those of *A. byzantinus* and *A. plumbeus*. Towards autumn the females do not fatten but the lowering of the temperature brings about deviations from complete gonotrophic harmony. As in *Aedes* the ingestion of a partial blood meal by the sandfly leads to the maturation of an incomplete batch of eggs.

Thus the blood sucking *Culicidae* and *Psychodidae* have a similar life-cycle the main characteristic of which is the necessity and sufficiency of one full blood meal for the maturation and laying of a single complete batch of eggs. In Stalnad the majority (ca 80 per cent) of female sandflies pass through one gonotrophic cycle only. Their low fertility (20-80 eggs) is compensated on the other hand by reduced mortality during the first cycle (when it is not necessary to undertake long flights) and on the other hand by the sheltered life of the larvae.

The life history of *P. papatasi* is of some epidemiological importance in spite of its short life-cycle. It is an efficient vector of sandfly fever owing to the transmission of the virus to the ova. As regards its rôle in leishmaniasis only those females which have a second blood meal (ca 20 per cent) are of any importance as vectors. Therefore the efficiency of this species in the transmission of leishmaniasis depends on its abundance and other favourable conditions.

C A Hoare

MAV (A) L. c. d. m. ase. ula. a. O. stru. or. L. nn. d. no. l. S. h. ra. nt. al. (Fort M'att. rs. Sahara. con. tant.) [Ocular Myiasis due to O. or. in Central Sahara].—*A. Inst. P. t. u. d. Alg.* 1941 Jun 1 1941 2 pp 87-89

PADOVA (C) L. cas. d. m. ase. ocula. e. O. tra. or. à. Be. O. f. (S. d. ran. s.) [Ocular Myiasis due to O. or. in Southern Oran].—*A. Inst. P. t. u. d. Alg.* 1941 In t. Pa. te. d. Al. in. 1941 Sept 1 of 1941 3 pp 36-38

STABILE (Américo) Sobre miasis de la vulva [Myiasis of the Vulva]—*Arch Uruguayos de Med Ciru y Especialidades* 1942 Aug Vol 21 No 2 pp 187-198 With 4 figs [11 refs]

DE MEILLON (Botha) A Toxin from the Eggs of South African Ticks—*South African Jl Med Sci* 1942 Nov Vol 7 No 4 pp 226-230 With 2 charts & 3 figs on 1 plate

MILLS (C A) & SCHMIDT (L H) Environmental Temperatures and Resistance to Infection—*Amer Jl Trop Med* 1942 Nov Vol 22 No 6 pp 655-660 With 1 fig [10 refs]

Various statistical studies have indicated that human resistance to infection is highest in cool middle temperate latitudes and is lowest in warm tropical areas. Whilst previously published work has shown that this has seemed to hold for tuberculosis, leprosy, acute rheumatic fever and acute nephritis, it has appeared that in order to be considered seriously, the general implications needed corroboration by carefully controlled investigations on experimental animals. Such investigations are described in the present paper.

Young white mice were placed in experimental chambers, some of which were maintained at a temperature of 90-91 F with 60-70 per cent relative humidity, whilst the others were kept at a temperature of 66-68 F. Three weeks or more of adaptation to these temperatures were allowed before any other experimental procedure was instituted. Earlier workers have shown that the major part of metabolic adaptation to change in environmental temperature takes place in the second and third weeks, with relatively minor alterations thereafter. Although animal growth is quite regularly depressed in moist heat, such retardation has barely begun at the end of three weeks. Thus the animals, in the hot and cold chambers were of similar weight when used, i.e. between 18-22 grammes.

At the end of the adaptation period 179 mice from the hot rooms and 172 from the cold were inoculated intraperitoneally with Type I pneumococcus (strain McGovern). Plate counts showed the inoculum to contain approximately 60 viable organisms. Injections were made at ordinary laboratory temperatures, but the mice were replaced immediately into their respective chambers. Hourly observations of deaths were made from the 20th to the 32nd hour, and every two hours from thence to the end of the 4th day.

There were sharp differences in survival time of the two groups, as practically all hot room mice died before any of those in the cold succumbed. Those from the cold room had a mean survival time of 44.91 ± 0.11 hours, while for the hot room mice this value was only 27.54 ± 0.15 hours, a difference which was highly significant. As body temperature differences in the mice might have altered the growth rate of the injected organisms and thus accounted for the observed differences in survival time, deep rectal temperatures were measured in 30 mice from each room. Mean values of 99.26 ± 0.08 and 99.91 ± 0.06 F were found for the cold and hot room groups respectively. While this 0.6 F difference is mathematically significant, it is of such low order that its influence upon the growth of pneumococci would probably be negligible.

Production of protective antibodies was studied in three different series of mice adapted to heat and cold as already described. Various dilutions of heat-killed culture of Type I pneumococcus were injected

intraperitoneally 4 to 10 days later varying numbers of the homologous living organisms were injected similarly and the animals observed for 72 hours. No striking differences were found in the protection afforded by the vaccine although in almost every pair of groups there were a few more survivors among the cold room mice. Application of the chi square test showed however that any difference was significant. Further series of mice from the two environments were injected with Type I anti pneumococcus serum (rabbit) and immediately thereafter inoculated with living Type I pneumococci. No significant difference was found between the hot and cold room animals: antibody requirement was the same for both groups.

In summarizing the authors indicate that further studies now in progress point to a reduction in phagocytic activity as probably the dominant factor in the lowered resistance brought about by environmental warmth.

C. G. Warner

HENSCHKE (U) Sonnenschutzmittel (Protection against the Sun)
—*Deut. Militärart.* 1942 Sept Vol 7 No 9 pp 581-589
With 3 figs.

The experience of the Africa Corps has emphasized the need for the protection of troops against the effects of sun's radiation. Different bands of the sun's radiation react in different ways on the human being and protection from the harmful wave-lengths is achieved mainly either by their absorption or reflection.

The danger from infra red radiation lies in its heating effect and the consequent production of sunstroke or heatstroke. These maladies are of such frequency of occurrence as to merit serious attention to protective measures. The wearing of suitable clothing is one method of protection against infra red radiation: owing to the highly reflective quality of this wave-length under appropriate conditions the colour of the cloth and the type of dye used are important. In this respect it is suggested that khaki uniform is not to be commended.

The sun's visible radiation (wave length 0.76-0.40 μ) is as harmful to health as the infra red. It can cause blinding—in winter sports centres for example the reflection from ice and snow of the sun's light gives rise to snow blindness—and also set up a skin irritation. A certain degree of protection to the eyes against blinding can be achieved by means of suitable peaks on caps but complete safety is assured only by the use of sun glasses. For case of skin irritation arising from sensitivity to light it is necessary to cover the skin with a thin layer of paste or ointment capable of filtering out the harmful rays.

The danger from ultra violet radiation (wave length under 0.40 μ) consists mainly in the production of erythema and experience during the past year has shown that there appear to be two different kinds of skin reaction—one in which the erythema is followed by pigmentation and the other in which direct pigmentation takes place. The erythema which is caused by a wave length of about 0.315 μ appears in about two to six hours after the exposure. One of the oldest known methods of protection against sunburn is the use of tannin. This has an extremely favourable absorption curve for ultra violet radiation but a disadvantage is its colouring effect on the skin. A 5 per cent solution of tannic acid in water when applied to the skin gives adequate protection from the erythema producing rays whilst there is also a high degree of filtering of the wave length causing direct pigmentation.

Recently however a number of preparations have been tried which while possessing the filtering efficiency of tannin do not stain the skin. Lists of these preparations—many of them proprietary ointments and lotions—are given in tabular form and they are graded according as they offer protection from (i) ultra violet radiation and visible light or (ii) infra red radiation. The following are typical of the preparations that have been found successful under these two headings. Protection from ultra violet radiation and visible light is given by the creams known as Delral H Ultra Zeozon and Antilux. For protection from infra red and ultra violet radiations and visible light the following preparations have proved efficacious: a 7 per cent phenyl salicylate ointment, yellow vaseline Engadina U V ointment and Nivea Ultra Cream. The filtering efficiencies of these preparations have been determined in terms of the application to the skin of a film of standard thickness of 0.01 mm. For adequate protection from the erythema producing wavelengths it has been decided that in the case of an ointment 80 per cent of the radiation intensity should be filtered off whilst for lotions the figure should be 90 per cent. If however particularly strong radiation is being encountered the proportions of intensity to be filtered off for ointments and lotions should be 93 and 98 per cent respectively.

C. G. Warner

BOOK REVIEW

CILENTO (Raphael) [Kt M D B S (Adel) D T M & H (Eng)
F K San I (Lond) etc.] [Compiled by] Tropical Diseases in
Australasia A Handbook Second Edition Revised—pp vii +
461 With 33 figs 1942 Brisbane W R Smith & Paterson
Pty Ltd [Price not stated]

The second edition of this book is a considerable improvement on the first—it is longer by 30 pages and most of the additions made are in small type. This increase in size has been made largely through the introduction of new material representing advances in knowledge since the time of preparation of the first edition but it also represents a greater tendency to discussion of debatable subjects than was previously evident. This tendency is to be welcomed. There are also several new sections—an addendum on psittacosis, a section on flagellate dysentery and food poisoning, a section on heat stroke and Appendix B an account in 26 pages of the arthropod vectors of disease in which are given keys to Australian anophelines and rat fleas as well as notes on the differentiation of culicines.

With minor variations the order of subjects remains essentially unchanged. Malaria and blackwater fever occupy first place and the account has been much improved especially in the section on treatment. Dengue and Q fever are described more minutely than before and it is evident that local experience has been rehed upon for the information given. This has resulted in a freshness of writing which carries considerable conviction. As would be expected the work is best in those chapters which deal with diseases important in Australia in the war has sharpened the interest in Northern Australia and New Guinea. Nevertheless most of the diseases which are of only secondary importance to Australasia have received attention and additions

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bringing the accounts up to date have been made to the sections on leptospirosis, plague, cholera, bacillary dysentery, ankylostomiasis, epidemic dropsy, prue and leprosy. The sulphonamides receive due acknowledgment throughout.

There is little to criticize perhaps the only dogmatic and (in the opinion of the reviewer) erroneous view the author adopts is his acceptance of the Vonib theory of prickly heat. He has written the book from the point of view of Australasia and his emphasis has therefore (and rightly) been placed on those diseases which mainly affect the Continent and its islands. That being so a reader cannot expect more than a brief reference to the bacteriology of cholera or the epizootology of sylvatic plague. The author supplies in concise form the kind of information which students and practitioners in Australasia will need and the book will be of undoubted benefit to members of the Forces of all nations called upon to serve there. Australian medical men have added much to medical science and the author does justice to the work among others of Joseph BANCROFT and his son J. L. BANCROFT on the transmission of *B. bancrofti* of BURNET on fever of LEE on heat stroke and of KELLAN and FELDBERG on TRETHEWIE and FAIRLEY on snake poisons. His own experience in New Guinea has stood him in good stead. A number of good illustrations have been added and are to be commended.

C II

We record with great regret the death on May 30th 1943 of Lieut (Colonel) A. G. V. HENDRICK M.B. D.Sc. F.R.C.P.E. F.R.S.E. F.R.S. (retd.) who as a Sectional Editor of the *Tropical Diseases Bulletin* from 1924 to the time of his death.

TROPICAL DISEASES BULLETIN

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SUMMARY OF RECENT ABSTRACTS*

VII HELMINTHIASIS

General

Surveys of intestinal parasites are reported by RENAULT & VERSIANI and by CANÇADO (p 5) from Bello Horizonte in Brazil. Agreement between them is fairly good for *A. caris* (19.8 and 19.2 per cent positive respectively) and *Necator* (16.99 and 15.2) but not for *Strongyloides* (17.26 and 8.2), *Schistosoma mansoni* (10.88 and 2.3), *Entamoeba histolytica* (8.33 and 12.5) and certain other protozoa. [In each investigation the specimens were taken from persons of all ages; the first named authors regard their figures as representing the incidence in the working class but Cançado makes no such claim since most specimen came from persons under medical care. It seems likely however that the two series are fairly comparable but it appears that far more of the second series were examined by concentration methods than of the first though special search was made for *S. mansoni* in the first series. No doubt the methods used were dictated primarily in the interest of diagnosis in the individual patients but the comparison seems to bring out the point that for epidemiological surveys some constant procedure should be adopted.]

MOHR (p 859) gives an account of the helminth infections seen in Germans who had returned to Germany from Africa. In children hookworm infection was the most common and in other persons *T. saginata*, the schistosomes and the filariae were found. He notes that eosinophilia was often present in the absence of worm infections.

SEARA (p 698) describes a modification of the method of Hoffmann, Pons and Janer for demonstrating helminth eggs in faeces. This cannot further be abstracted; details are given in the summary.

Immunity —ACKERT (p 624) has written a comprehensive account of the factors concerned in natural resistance to helminthic infections. Dietary factors, genetic constitution and age are concerned. It is not possible to condense further the admirable review of this paper written by the late Professor Warrington YORKE.

The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin* 1943 Vol 39. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

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of individual sufferers but in his opinion this will not prevent the continued spread of the disease.]

BRUMPT (pp 8 866) has made a study of the biology of *Platys* (*stralorbus*) *glabratus* in Venezuela and has proposed measure of control. Prevention of promiscuous defaecation has proved impracticable in control of schistosomiasis in that country. treatment of infected persons; disappointing in practice and the only hopeful procedure is to eliminate the snail. This may be done by various methods. Useless collection of water should be removed by irrigation canals and drains should be replaced by cement drains. sea water in a strength of 35-40 per cent maintained for several days will destroy the snails. copper sulphate or carbonate gum kline or ammonium sulphate may be used acclimatized *B. lantus* a *sphaca* may be planted beside open water. Alternate draining and filling of the canal is not effective. Brumpts studies showed that these snail have considerable resistance to drying and that a large proportion in one laboratory experiment remained alive after 30 days of drying more severe than is encountered in nature. LOGFI (p 563) has succeeded in infecting a large proportion of *Plumoris* and *Oncomelania* snail each with a single cercaria of *S. mansoni*.

KOPPEL (p 563) describes the fundamental histopathological unit of schistosomiasis (*naiss*) as the pseudo-tubercle which develops about the ova. This contains eosinophils and polymorphonuclear cells in the early stage with later epithelioid cells and it finally undergoes fibrosis. The disease is primarily hepatic and colonic and the pathological changes are instigated mainly by deposition of ova in the tissues. Cirrhosis; periportal in distribution and splenomegaly; at least partly due to the hepatic cirrhosis and splenomegaly; at least partly due to the hepatic cirrhosis and splenomegaly. In the late stages there is great similarity between schistosomiasis and Banti's disease but pulmonary symptoms may be prominent in the former.

ORTIZ (p 463) notes that in *S. mansoni* infection fever may be found in the early stage (of invasion and distribution of the larvae) or later when the infection has become chronic and the liver can no longer deal with the toxins or when intestinal lesions have admitted bacteria to the blood and kidneys. He found early fever sometimes simulating typhoid in 71 per cent and late fever in 78 per cent of cases. CARLISLE (p 628) discusses schistosomiasis of the appendix which may be a chronic condition devoid of characteristic features but in which acute or subacute exacerbations frequently occur and may lead to gangrene or perforation. MEIRA (p 9) discusses the diagnosis of rectal schistosomiasis by means of sigmoidoscopy and radiology. no lesions diagnostically specific were generally seen and the author points out that examination of the faeces is essential. GELFAND (p 10) describes 10 cases of schistosomiasis (*mansoni*) of the Fallopian tubes.

ESPIN (p 466) reports a case of myelitis with paraplegia caused by the tissue reaction to eggs of *S. mansoni* in the dorso-lumbar region of the spinal cord.

MAGALHAES and COELHO (p 10) describe eight cases of hepatic cirrhosis with primary malignancy in five of these *S. mansoni* infection was present. It is considered that the toxins of the worm exert the cancerogenic effect and that these toxins reach the liver by the portal vein. Rectal schistosomiasis associated with rectal carcinoma is rare but benign tumours may develop as a result of the energetic connective tissue reaction stimulated by the eggs.

RISQULZ and BOZA (p 569) state that an antigen prepared from cercariae of *S. mansoni* obtained from *Platiorbis guadeloupensis* has given positive reactions in a skin test in all patients tested who were suffering from chistosomiasis. They do not give detail of methods of preparation.

KRAKOWER *et al* (p 562) have shown that whereas in rats infected with *S. mansoni* and kept on a normal diet there is marked destruction of the parasite in the liver the maximum being between the 5th and 7th weeks after infection in rats maintained on a diet deficient in vitamin A this destruction is either minimal or absent. They discuss the possible mechanism by which destruction is brought about.

ZELLWEGER (p 870) reports a considerable incidence of *Schistosoma intestinalis* infection in parts of Gabon. He describes the symptoms associated with the early (acute) stage and the later (subacute) phase. These are not unlike those found in *S. haematodes* infection. In treatment Fouladin and anthelmintic are satisfactory.

VOGEL (p 700) has described the development, length of life and death of the eggs of *S. japonicum* in animal. It appears that the maximum life of the eggs is 21 days of which 9-10 are occupied in development. Mature miracidia can therefore live only 11-12 days.

BOYNE *et al* (p 628) found infection with *S. japonicum* in man, dog and deer in the Lake Lindoer region of Celebes but no snail of the genus *Oncomelania* could be discovered. There is a suspicion that *Lymnaea* snails may play a part in this infection but this has not been proved. Cercariae which gave rise to chistosomes in mice have been obtained from the e snails but the worms could not be identified as *S. japonicum*.

An account is given in the *Monthly Bulletin Manila* (p 468) of the incidence of schistosomiasis in the Provinces of Surigao, Leyte and Mindoro where 67 to 97 of dispensary patients were found to be infected. Most of the cases were in children aged 5-15 at which period there is the greatest exposure to parasite infested waters. The chief clinical findings are enumerated. Treatment consists of administration of Fouladin and emetine. DINO *et al* (p 466) report 14 cases from the Philippines in which appendicitis was due to the presence of eggs of *S. japonicum* in the wall of the appendix [see also CARLILE above]. Round the egg were tubercles similar to those caused by the tubercle bacillus and visible to the naked eye [see also KOPPISCH above]. This infection induces chronic inflammation with some obstruction and in acute cases secondary infection occurs. In only two of these cases were eggs found in the faeces before operation.

VITUG *et al* (p 11) describe two cases of *S. japonicum* infection with cerebral involvement. One patient died but the other recovered after treatment with Fouladin.

TUBANGI and AGUILA (p 467) report cure in 10 of 19 cases of *S. japonicum* infection treated with Fouladin.

AFRICA and GARCIA (p 467) found mature *S. japonicum* in the inferior vena cava and right auricle of two experimentally infected monkeys. They discuss the possible route by which the worm reached the right heart.

PENNER (p 769) states that *Schistosoma muris fillophilum* is the same as *S. douglasi*, the cercariae of which can produce swimmers' itch and the natural host of which is the field mouse. He discusses the distribution, snail hosts and control of this trematode. MILLER (p 12) reports that in the control of chistosome dermatitis the use of a solution

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containing copper sulphate and copper carbonate which is syphoned from a boat on to the lake bottom so that 20 lb copper sulphate and 25 lb copper carbonate are used for each 25 000 square feet of beach is enough to prevent the itch. A similar conclusion is reported on pp 566 and 567.

Onematodes — BERGE *et al* (p 703) in reporting a case of *Fasciola hepatica* infection in Tunis emphasize the dominant signs of eosinophilia (up to 66 per cent in the later stages) colic without fever and loss of weight without anaemia. The liver was shrunken and enlarged. In this patient duodenal intubation revealed the eggs of the fluke which were not found in the faeces. Treatment with emetine and neosalvarsan was inefective and the prognosis was grave. The point out the danger of a true watercress of unknown origin. SHAW and CLYNE (p 14) record the finding of *Fasciola hepatica* in a subcutaneous nodule over a rib. In comment LANGE gives his opinion that the fluke had probably not escaped from the liver but that the cercaria had strayed in a non optimum host and become detained in the subcutaneous position never having reached the liver.

DIENGSIANG and MANGLASIRAYA (p 564) report a family all the members of which were infected with *Fasciolopsis buski* in Thailand. One child suffered from diarrhoea a celiac oedema of the face and legs and was thin but the others had mild gastro-intestinal disorders only. Oil of chenopodium appeared to be a useful anthelmintic. GALLARD and DANG VAN NGU (p 13) report a few cases of human infection with *Fasciolopsis buski* in Tonkin where pigs are heavily infected. ROY and YOKOGAWA (p 13) describe the changes in *Pirionia* used for emetine and P. nitrosee this Bulletin 1941 Vol 33 p 47. Dismigration of the flukes was seen in cases in which eggs disappeared from the sputum.

YASR (p 70) has found the fluke *P. leucosticta* in the intestine of man in Egypt. It is exceedingly common in dogs and cats which eat fresh water fish from the Nile. The intermediate hosts are the snail *Clotopababides* and *Valispiris* and the fish *Tilapia nilotica* and peccot of mullet. The worm has a short life but may apparently give rise to dysenteric symptoms. It seems to be limited to Egypt and Palestine. The worm has a short life but is not common in Argentina. Identification of species.

SCOLARI and OCAY (p 566) have extracted a diatom from the subcutaneous tissue of a child in Argentina. Identification of species. BOVET (p 14) has reviewed the question of *Echinostoma* infection of man around Lake Lindoe in Central Celebes. The first intermediate host of this fluke is the snail *Amisus saras* no intermediate host is usually the mud crab *Corbicula leleupis* but the cercariae of *Echinostoma* which is eaten by the lake-side people. *Corbicula leleupis* may also act as an intermediate host but the cercariae of *Echinostoma* prefer *Corbicula*. No reservoir host has been found and the author does not consider that *E. leleupis* and *E. reconditi* are a natural parasite and echinostomiasis there is an ideal adaptation between man and mud crab identical with the infection of musel around Lake Lindoe. Explained by the presence of foci of human infection in the three lake-side villages. There is how a species of *Echinostoma* which

differs in some respects and which is developed in animals fed on the mud of *Corbicula linduensis*—this species has not been found in man and there must be an animal host. BOVNE *et al* (p 629) make a further detailed statement on similar lines of the hosts of *Echinostoma lindoense* and of other related trematodes in Celebes.

BOVNE (p 565) gives a diagnostic table for the four echinostomes found in man in the Netherlands Indies—*Euparyphium alocanum* (reservoir field rat) *Echinostoma lindoense* (no animal reservoir known) *Euparyphium malayanum* and *E recurvatum* both of which have been found in man once only.

Cestodes

BRANDT (p 90) describes a method for the differential staining of hooklets of tapeworms by means of hot methyl violet or basic fuchsin. Details are given in the original abstract.

MUELLER and COULSTON (p 89) inoculated themselves subcutaneously with spargana of *Spirometra mansonoides* obtained from a monkey and the larvae were excised after periods of 68, 69 and 93 days. One when tested was able to continue its natural evolution in the cat. The larvae migrated from time to time in the tissues of the experimenters and at the same times general symptoms of urticaria were produced probably owing to the release of toxins from the site of encapsulation. Eosinophilia was present and skin reactions to antigens from the same and other species were positive and remained so for at least 20 months after removal. Complement fixation tests were unaffirmatory. *S mansonoides* is therefore a potential human parasite and may render swimming in certain natural bodies of water carrying the intermediate copepod host or the use of shallow well or spring water etc dangerous.

ITAGURA (p 90) reports a case of human sparganosis in Okayama. Russian scientists (p 567) have described the life-cycle of *Diphyllbothrium minus* a human tapeworm endemic in the Lake Baikal area. Species of Cyclops and fresh water fish are the intermediate hosts.

TRELLES and LAZARTE (p 468) give an account of the microscopic pathology of cerebral cysticercosis. The three main clinical conditions are convulsions, raised intracranial pressure and psychic changes but all are subject to great variation. In diagnosis X-ray may help when the cysts are calcified and biopsy of a cyst is diagnostic. Surgical treatment guided by localizing symptoms has been useful but the multiplicity of cysts of course restricts its value. Prevention consists of prompt treatment of worm infestation and the supervision of meat. EWING (p 92) describes the post mortem appearances in a case of cysticercus epilepsy. DICKSON and WILLS (p 92) remark that in a case of cysticercus epilepsy they found the unusual features of grossly raised intracranial pressure, rapidly increasing papilloedema with a normal ventriculogram. In a case of cerebral cysticercosis GRANA and SCHMONE (p 705) noted that the cerebrospinal fluid was not clear, showed a high degree of eosinophilia (32 per cent in one case) and contained an excess of glucose.

Remarking on the rarity of cerebral cysticercosis in childhood SALDUN DE RODRIGUEZ *et al* (p 704) report a case in a girl of 14 who had had attacks of epilepsy since the age of 11.

BRAILFORD (pp 91-705) discusses human infection with *Cysticercus cellulosae* usually in Britain seen in men who have served in India. Calcification of the cyst does not usually take place until after a blind period of about five years.

CULBERTSON and CRESSFIELD (p 631) report that although atabrine given prophylactically has some retarding action on the development of *Cysticercus fasciolaris* in the mouse its curative action is not significant. The drug cannot be regarded as useful in treatment of human cysticercosis but one of the other acridine derivatives might serve the purpose.

CLAPHAM (p 631) reports a case of infection of the human brain with *Coenurus cerebralis*. This is apparently the second instance to be recorded. CANNON (p 879) also reports a case of human infection with a species of *Coenurus* in an African. This formed a swelling in the forearm which was removed under local anaesthesia.

BARNETT (p 469) gives figures of the incidence of hydatid disease in New Zealand. In general there is a rising incidence in man. About one third of the dogs in rural areas harbour the worm but in town dogs infection is very rare.

MEADE and BARNETT (p 470) report from New Zealand a case in which alveolar hydatid disease was associated with the ordinary form of liver hydatid. The alveolar type is similar to the forms which have been found sporadically outside the Bawro-Tyrolean endemic area. Barnett discusses the origin of this type and inclines to the opinion that there is no necessity to postulate the existence of two different varieties of *Echinococcus granulosus*. The change to the alveolar type may be due to a malignancy mutation brought about by chemical compounds or to a carcinogenic factor.

Hydatid disease is common in Concepcion Chile and WILHELM (p 469) reports that 38 per cent of dogs have been found to harbour the adult worm.

BARNETT (p 9) discusses multiple peritoneal hydatid cysts. Rupture of a cyst releases enormous numbers of scolices most of which die but which tend to settle in the pelvis. Prognosis is not so bad as is generally assumed. The author gives advice on surgical treatment. PEAY (p 40) discusses hydatid disease of the kidney from the surgical point of view.

SEVENJI (p 93) describes the preparation of a polysaccharide antigen from the cell wall material of hydatid cyst. In the Casoni test this substance which can be prepared in large quantities and which keeps well gives uniform and reliable results. The author points out that there may be considerable difference in the potency for the test of hydatid fluid from animals and the uniformity of the polysaccharide antigen is an advantage. Details of the method of preparation are given. GREVAL *et al* (p 91) state that pooled fluid from hydatid cysts treated with 0.5 per cent of a mixture of equal parts of ether and trichloroacetic acid acts as a reliable and stable antigen for the complement fixation test. This test can be used to measure the retrogression of hydatid disease resulting from non-surgical treatment. CULBERTSON and ROSE (p 9) state that this is not suitable for use in skin tests in hydatid disease can be derived from a study of many genera and species. They give a list of some of the species. *Cheryl Wilcocks*

[To be continued]

MALARIA

MACNALLY (Arthur) Indigenous Malaria in Great Britain — *Nature* 1943 Apr 17 Vol 151 No 3833 pp 440-442

NICHOLS (J B) Recent Mortality from Malaria in the United States — *Lirgima Med Monthly* Richmond 1942 Dec Vol 69 p 681 [Summary taken from *Jl Amer Med Assoc* 1943 Feb 13 Vol 121 No 7 p 544]

In 1900 the death rate for malaria in the census registration area of the United States was 7.9 per hundred thousand. Under the vigorous antimalarial procedures then instituted the rate declined to 3.9 in 1905. From 1905 to 1937 the rate fluctuated from 3.8 to a minimum of 1.9 in 1926 without much change in the general trend. The statistics for 1938, 1939 and 1940 show such a significant change in the trend that Nichols presents them. For 1938 the death rate was 1.8 for 1939 it was 1.3 and for 1940 it was 1.1. The annual mortality for the entire period 1930 to 1940 shows that since 1937 there has been a sharp and continued decrease in mortality from malaria in the United States. This suggests that new conditions antagonistic to the disease have been established. The most obvious explanation for the decrease in mortality is that it was the result of the energetic and extensive antimalarial measures that were being carried out in the South where most of the deaths from malaria in the United States occur.

PINTO (Cesar) & CLAUSELL (D T) Contribuição ao estudo da malaria quântica (Plasmodium malariae) — Novos focos em Minas Gerais, Brasil [New Focus of *P. malariae* Infection in the State of Minas Gerais, Brazil] — *Rev. Brasileira Biol.* Rio de Janeiro 1942 Dec Vol 2 No 4 pp 489-494 With 5 fig. (1 map)

A health survey of the labour forces engaged on road construction on the Rio Baía highway in the valley of the Rio Doce in the State of Minas Gerais was made in August and September 1942. The blood of 590 of these workers was examined. malaria parasites were found in 38 — *P. falciparum* 17, *P. vivax* 13, *P. malariae* 5, *P. n. malariae* and *P. falciparum* 1, *P. falciparum* and *P. vivax* 2. Details are given concerning all six patients with *P. malariae* infection. One of these, a boy aged 14, harboured also *Necator americanus*, *Ascaris lumbricoides*, *Trichuris trichiura* and *Schistosoma mansoni*. The endemicity of chittomaria in this valley detracts from the value of the spleen index as a measure of malarial endemicity. Epidemiologically *A. darlingi* and *A. farsus maculatus* are suspected vectors of *P. malariae*. Four other Anopheles have been encountered locally: *A. albivittatus*, *A. clausi*, *A. arvensis* and *A. minor*. Norman White

CLAUSS (O R) A Method for the Collection, Transportation and Study of Anopheline Eggs and Adults — *Amer. Jl Trop. Med.* 1943 Jan Vol 23 No 1 pp 133-137 With 6 figs on 2 plates

The author describes a method by which large numbers of egg batches correctly associated with the female which produced them can be transmitted from the field to a central laboratory. Single wild

caught females oviposit in vials measuring 2×5 cm plugged with cotton wool. The female is chloroformed and placed in a numbered starch capsule. The eggs are filtered off through a filter paper bearing the same number and the partially dried filter paper folded and fastened together with a stapler. Large numbers of such collections are packed in a single container and the eggs are said to remain viable for a number of days.

J. B. H. Lessworth

BRIGHENTI (D.) Osservazioni biologiche sugli anofeli. Sull *Anopheles (Myomyia) pseudopictus* [Biological Observations on *A. hyrcanus* var *pseudopictus*]—*Boll. Soc. Ital. Biol. Sper.* Naples 1942 Vol. 7 No. 4 pp. 784-80 [Summary taken from *Rev. Appl. & Fr. on Ser. B* 1943 Apr. Vol. 31 Pt. 4 p. 78].

The author describes white rings that he has observed on the antennal segments of samples of *Anopheles hyrcanus* var *pseudopictus* Grassi taken by him in rice fields and along the Adriatic coast in Italy. They have not previously been described in this variety which he regards as a distinct species. He states that it differs from other *Anopheles* lines in the attitude in which it rests on walls since its body is always extended at right angles to the surface. It is never found on the ceiling or upper part of the walls of houses and animal quarters but only on the lower part of the wall not more than 5 ft from the floor. It is negatively phototropic.

CALSEY (O. K.), DEANE (L. M.) & DEANE (M. P.) Ecology of *Anopheles gambiae* in Brazil—*Am. J. Trop. Med.* 1943 Jan. Vol. 23 No. 1 pp. 73-94.

This paper contains a very large amount of information about the biology of *Anopheles gambiae* in Brazil collected during the campaign for the extermination of the mosquito from 1940 onwards. Only the light-coloured variety of *A. gambiae* which breeds in fresh water was introduced into Brazil. Detailed observations made in the laboratory on its oviposition habits, number of eggs, duration of early stages, longevity and so forth are here recorded. Observations and experiments in the field showed that the habits of *A. gambiae* in Brazil were the same as in Africa. It bred in small collections of fresh water comparatively free from vegetation, fully exposed to the sun and usually near human dwellings. The larvae were never found in brackish water although in the laboratory development could take place in up to one per cent sodium chloride concentration. The adults entered houses only when occupied by man and they showed a very decided preference for feeding on human blood. (cf. this Bulletin 1942 Vol. 39 p. 593). Even in moist regions more than four fifths of the mosquito population migrated at night and within 24 hours and in hot dry regions a still greater migration took place. In the experimental areas the infection rate of *A. gambiae* was 76 per cent compared with 10 per cent in a species of the same circulation group and nil in *A. albargyris*.

J. B. H. Lessworth

DEANE (M P) & CAUSEY (O R) Viability of *Anopheles gambiae* Eggs and Morphology of Unusual Types found in Brazil—*Amer J Trop Med* 1943 Jan Vol 23 No 1 pp 95-103 With 6 figs

In order to test the possibility of the eggs of *A. gambiae* surviving for long periods in moist shaded sand or mud large numbers of experiments were carried out in the laboratory After storage for 14-18 days in moist sand only a fraction of one per cent of the eggs hatched None survived longer storage After keeping in drying sand for 18 days one per cent of the eggs hatched It was evident in these experiments that most of the eggs became non viable about 12 days after oviposition but that there was a very small percentage of resistant eggs In further experiments it was found that if the females were kept at low temperatures (10-13 C) for three or more days after a blood meal they laid an abnormal type of egg in which a reticulated exochorion extends over the entire dorsal surface These eggs resemble the resistant winter eggs described by HURLBUT in *A. walkeri* [*J Parasitology* 1938 Vol 24 p 521] V B Wigglesworth

GOODWIN (Melvin H) Jr Studies on Artificial Resting Places of *Anopheles quadrimaculatus* Say—*Jl National Malaria Soc* Tallahassee Fla 1942 Vol 1 No 1 pp 93-99

With the object of comparing the density of populations of mosquitoes in different localities attempts have been made in recent years to devise standard types of artificial daytime resting places The most successful of these so far has been the small nail keg (see this *Bulletin* 1942 Vol 39 p 811) The author describes a new type which consists of a cubical wooden box with a 12 inch side open at one end These boxes were less attractive than the natural resting places (animal shelters sheds privies hollow trees culverts etc) but they attracted more mosquitoes than did the nail kegs They were more attractive if painted red inside and out than if painted black No significant difference appeared when the boxes were pointed in different directions and there was little difference between boxes at varying heights up to six feet above the ground though when vertical tiers of boxes were available the mosquitoes preferred those within 3 feet of the ground V B Wigglesworth

LUND (Horace O) Studies on the Choice of a Medium for Oviposition by *Anopheles quadrimaculatus* Say—*Jl National Malaria Soc* Tallahassee Fla 1942 Vol 1 No 1 pp 101-111 With 2 figs

Experiments were made in a cage in the laboratory in which females of *Anopheles quadrimaculatus* were offered dishes of water differing in various respects with the object of discovering by what factors the female is influenced in selecting water for oviposition It was found that in a dim light gravid females of *A. quadrimaculatus* chose dark rather than light containers in which to lay their eggs But no significant differences could be demonstrated when many other factors were compared for example hardness of water concentration of calcium ions muddiness presence of algae salinity phosphorus or ammonia content tannic acid content pH presence of ferric or aluminium chloride etc V B Wigglesworth

KOPP (Israel) & SOLOMON (Harry C.) Liver Function in Therapeutic Malaria — *Jl Med Sci* 1943 Jan Vol 203 No 1 pp 90-9 24 refs 1

In a study of the effects of long-continued administration of tryparsamide upon the liver it was necessary to determine the effect that malarial therapy to which the patients in question were submitted had upon liver function. This paper records the results of the study of nine patients. Liver function was determined before and after malarial therapy. The patients were inoculated with *P. vivax*. They were allowed to have from 4 to 12 paroxysms of malaria after which 30 grains of quinine were given daily for a week. Liver function was determined by the following procedures: bromsulphthalein dye test, cholesterol total free and ester, phospholipids, hippuric acid excretion, cephalin cholesterol flocculation test of Haner, fibrinogen, total bilirubin, and a Bergh reaction, icteric index. The technique used in carrying out these tests is described.

The disturbance of liver function caused by malaria was shown by moderate bromsulphthalein retention, a marked reduction in cholesterol and cholesterol ester, a moderate fall in the phospholipids, diminished hippuric acid excretion, and a strongly positive cephalin flocculation test. The impairment of liver function was transient; function was fully restored from 3 to 6 weeks after the termination of the malaria. The cephalin flocculation test was the last to return to normal. The administration of pentavalent arsenic tryparsamide did not seem to delay the appearance of normal reactions except for the cephalin flocculation test. Jaundice occasionally appears when arsenicals are given after recovery from malaria. This is possibly due to the retention of the liver before normal function of that organ has been restored. This danger is probably less with pentavalent than with the trivalent arsenical preparations neoarphenamine, mapharsen, and arphenamine, considerable quantities of which are excreted by the liver.

Norman White

JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION 1943 Mar 6 Vol 121 No 10 1 763 — Mental Symptoms following the Use of Atabrine

This is a short editorial in which reference is made to the discussion by Field in the *Bulletin* 1939 Vol 36 p 877 on the occasional mental effect of atabrine. The editorial points out that the incidence of mental symptoms has been equally small in the Western Hemisphere, and that there have been no reports of these occurring as a result of administration of the drug in prophylactic dosage. It is also pointed out that confusional psychosis sometimes occur as a direct result of malaria and that it should not therefore be assumed that every mental aberration following treatment with atabrine is necessarily due to the drug. Under present circumstances the Surgeon General, United States Army, has ruled that quinine prophylaxis is to be used only if a man cannot tolerate atabrine.

C B

RENN (Charles E.) The Crushing Strength of Biological Films on Natural Waters and the Spread of Larvicidal Oils — *Jl Florida Malari Soc* Tallahassee Fla 1941 Vol 1 No 1 pp 45-50 With 2 figs

When natural waters are undisturbed by wind or rain thin membranes form over the surface. These consist mainly of bacteria, protozoa, algae,

pollen dusts and microscopic debris imbedded in a tough inelastic bacterial slime. If there is a light wind they become concentrated at the leeward margins of the pools. These films have a certain rigidity and so reduce the surface tension of the water and resist the spread of oils on the water surface. The degree of resistance offered by the films (that is their crushing strength) has been determined by noting their ability to block the spread of oils of known spreading pressure. The values are often greater than the spreading pressures of larvicidal oils particularly at the leeward side of pools and hence no spreading occurs. When this is so the film must first be broken by agitating the water. It is readily destroyed by strong winds and rain or even by heavy mists.

V B Wigglesworth

BISHOP (Ann) Variation in Gametocyte Production in a Strain of *Plasmodium relictum* in Canaries—*Parasitology* 1943 Feb Vol 35 Nos 1 & 2 pp 82-87 With 2 figs

Over a period of two years during which a strain of *Plasmodium relictum* was being maintained in canaries by blood inoculations observations were carried out on the number of gametocytes produced. It was noted that the number of gametocytes not only varied from bird to bird but that there was a considerable difference in the number produced in birds inoculated from a single bird. Thus in two old birds and two young birds of the same age inoculated with blood from a heavily infected bird the ratios of gametocytes to red blood corpuscles were 1 809 1 385 1 235 and 1 6410. Furthermore in this series there was no correlation between the number of parasites in the blood and the gametocytes the parasites per 1 000 red blood corpuscles in the four birds being 103 144 212 and 50. Similar variations occurred in all the birds observed during the two years. It was noted that after the peak of the infection in any individual bird was passed and the infection began to subside there was a fall in both asexual forms and gametocytes a fact which indicated that gametocyte production was not in response to the development of immunity. Another point of interest was that the number of gametocytes produced was highest during the period of the year April to July or August. Over the whole period there was no evidence that gametocyte production decreased with repeated blood transmissions as was found to be the case by GAMBRELL in *P. cathemerium* infections [see this *Bulletin* 1938 Vol 35 p 729].

C M Wenyon

HURLBUT (Herbert S) & HEWITT (Redginal) The Transmission of *Plasmodium lophurae* an Avian Malaria Parasite by *Anopheles quadrimaculatus*—*Public Health Rep* 1942 Dec 11 Vol 57 No 50 pp 1891-1892

Transmission experiments were positive the exogenous cycle of the parasite was completed in about 17 days when the mosquitoes were maintained after infection at 74-80 F. Oocysts had previously been found in *A. quadrimaculatus* but transmission had not been effected.

C W

TRY PANOSOMIASIS

VAUCEL. La maladie du sommeil au Cameroun [Sleeping Sickness in the Cameroons]—*Rev Sci Med Pharm et Vét de l'Afrique Française Libre* Brazzaville 1942 July Vol 1 No 1 pp 100-112 & Oct No 2 pp 88-110 [21 refs]

Sleeping sickness in the Cameroons was discovered in 1899 and during the next twelve years cases were found in widely separated parts of the territory. The cession of adjoining French territory to Germany in 1911 added further infected areas. Although a sleeping sickness camp was formed in 1910 an intensive campaign was not started until 1913 when four medical posts and three sleeping sickness camps were established in the region of the Nyong river with a staff of six doctors and nine male and two female trained assistants. They adopted the following measures: (1) closure of declared infected areas with strict control of the movements of the population; (2) medical treatment by atoxyl injections which in highly infected areas were given to the whole population; (3) bush-clearing, cultivation and trapping and catching of tsetse flies; (4) administrative measures including exemption of tax, restriction of labour, road development and resettlement of population. This campaign was stopped by the war of 1914.

In 1920 a special Service was organized with a staff of two doctors and eleven native assistants whose work was confined to diagnostic surveys and treatment within a limited area. In 1921 after twenty months 70 000 people had been examined out of a population of 128 000 and 8 548 infected persons were diagnosed. In March 1922 Dr JAMOT became director of the campaign and emphasized above all other measures the importance of diagnostic survey and the reduction of the human reservoir of trypanosome. For this reason he strongly opposed the practice of lumbar puncture which in French Equatorial Africa was then considered necessary for a decision as to the form of medical treatment. He relied on atoxyl injections given as frequently as possible but occasionally ordered treatment with tryparsamide in order to reduce a high mortality in certain places where atoxyl was unsuccessful. The latter drug was then reserved for prophylaxis in these places. In 1932 when the position was completely under control LEBENTU succeeded Jamot and introduced lumbar puncture and a more individual form of medical treatment.

In 1926 the prophylactic Mission was created with a staff of 11 doctors, 20 sanitary assistants and 150 native dressers and this was increased later to 18 doctors, 36 sanitary assistants and 400 native dressers. In 1931 it was connected into an autonomous service and was incorporated in the following year into the Native Medical Services.

Distribution of the disease

1. From 1922 to 1926—The Nyong river flowed through an epidemic centre of great severity. In 46 villages with a total population of 20 351 there were 14 374 infected persons among 17 797 examined; in 59 areas in this region there were 40 per cent or more infected; in 36 areas there were over 60 per cent and in 11 areas the proportion varied from 80 to 90 per cent. In a total population of 125 535 there were 33 537 (29.7 per cent) infected out of 112 945 examined. The infection spread in all directions from the Nyong river area far beyond

the limits of the first sector By the 1st July 1926 64 012 infected persons had been discovered

2 *From 1926 to 1929*—The second stage began with the formation of the prophylactic Mission and another two years were needed to define the limits of the disease At the end of 1928 an almost complete chart of sleeping sickness in the Cameroons had been prepared

At the end of 1920 Jamot divided the infected regions into A Epidemic zones with over 15 per cent of the population infected and comprising three centres Among 194 889 persons examined 82 583 (43.2 per cent) were infected B Endemo epidemic zones situated between and around the epidemic zones and with about 15 per cent infected These comprised five centres 23 319 infected persons (14.5 per cent) were found among 160 306 examined C Endemic zones and transitional zones between infected and healthy regions Out of 287 257 persons examined there were 6 893 (2.4 per cent) infected

Altogether of a total population of 752 520 there were 669 971 (88 per cent) examined of these 115 354 (17.2 per cent) were found infected

Mortality—Before the establishment of the prophylactic Mission 64 012 cases had been diagnosed and of these 21 673 (34 per cent) had died between 1920 and July 1926 Further figures have shown that the annual mortality varied from 5 to 15 per cent in different foci among untreated cases Jamot concluded that it varied from 25 to 50 per cent

Results—On the whole the result of the action taken which was almost entirely restricted to treatment of the infected was an immediate decrease in the number of new cases and in the parasite and mortality rates Figures are given of the effect in various areas In certain epidemic regions the parasite index fell rapidly to very low figures e.g. from 52 per cent to 1.79 per cent in one year from about 80 per cent to about 5 per cent within a few years and finally to about 2 per cent and in another area from 80 per cent in 1923 to 23.5 per cent in 1928 and 0.71 per cent in 1938

The incidence of new infections and the mortality rates also diminished greatly in some cases this was thought to be due to the use of tryparsamide The author finds it difficult to attribute the success entirely to chemotherapy Some tribes have been freed from trypanosomes by injections of atoxyl others seem to have been saved from total destruction by tryparsamide But atoxyl is followed by about ten per cent of parasitic relapses and has no action on meningeal lesions and though tryparsamide may have reduced the mortality it is harder to understand the rapid decrease in the new cases since its trypanocidal action is weak In other places similar medicinal treatment encountered resistance checks and revivals of infection which are inexplicable A certain impression however emerges marked success in the spreading zones resistance and checks in old endemic foci situated in swampy riverine areas infested with tsetse

The position in 1939 was as follows most of the old foci were extinct or under control with parasite indices of about one per cent or less On the other hand the incidence of new cases had arisen during the last two years in certain western regions It is easy to see that there has been little further change since the striking success of the campaign of 1927-1928 which reduced the number of new cases from 54 712 to 6 000 in 1929 During the last ten years the incidence of

new cases has remained about the same and seems to have reached a third hold impossible to cross. Here and there every year small foci appear and the reason is difficult to understand. Drug resistance can have little influence since most of the patients are treated far from their villages. Chemotherapy enriched during recent years by new products cures most of the cases but cannot eradicate trypanosomiasis. The disease no longer affects the fibres of population and hardly interferes with economic activity but these results are only maintained by continuous vigilance. Something more is required. In addition to advising stronger administrative measures the author discusses the question of breaking contact between man and fly by settlements of people and destruction of tsetse. He mentions the theory of the possible existence of specially virulent trypanosomes in endemic areas and perhaps also of specially receptive and infective races of tsetse. Migrations of such flies from time to time might cause brief epidemics soon subsiding owing to the unfavourable environment for the fly.

The purely medical efforts will only be completed by the agricultural economic and social development of the country

J. F. Corson

MALBRANT (R) *Gibier tsetse et trypanosomases (Game Tsetse Flies and Trypanosomiasis)*—*Rev. Sc. Méd. Pharm. et Vét. de l'Afrique Française Libre* Brazzaville 1942 Oct Vol 1 No 73-87

This appears to be a discussion very much on the lines of that abstracted in this Bulletin 1942 Vol 39 p 242

CHORLEY (J. K.) *Tsetse Fly Operations 1941 Short Survey of the Operations by Districts for the Year ending December 1941—Rhodesia Agric. J.* 1942 Vol 39 pp 231-235 [Summary taken from *Let. Bull.* 1943 May Vol 13 No 5 p 173 signed U. F. RICHARDSON]

During 1940 the zone covered by anti tsetse operations in Rhodesia were pushed forward to give additional protection to the ground already recovered from tsetse estimated at over 6 000 sq miles and 1941 as devoted mainly to consolidation of the newly occupied advanced position. Native cattle have continued to increase in areas previously cleared of tsetse and in some cases the demand for new grazing has resulted in native cattle being pushed forward into areas of retreating fly with embarrassing precipitation. A large scheme of native settlement in the Urungwe Native Reserve as to be carried out in 1942 and also a scheme for post-war European settlement is being planned for this area and here a considerable increase has been made in the number of native hunters. Two new roads have been cut and posts medical centres provided and schemes of soil and water conservation prepared.

Over 6 000 game animals have been destroyed during the year. The position in restocked areas appears to be satisfactory but there has been an extension of *G. morsitans* toward the Rhodesian border from Portuguese territory and in the Melssetter area there have been suspected outbreaks of trypanosomiasis on 33 farms.

By the courtesy of the Portuguese authorities a rapid survey of conditions in the neighbouring Portuguese territories has been made by Rhodesian and South African officials.

GILBERT (T W) Preliminary Report on Pentamidine in the Treatment of Late Cases of Sleeping Sickness—*Trans Roy Soc Trop Med & Hyg* 1943 May Vol 36 No 6 pp 353-358

Brief notes are given of the treatment of 14 cases of human trypanosomiasis (*Trypanosoma gambiense*) in Northern Rhodesia near Lake Tanganyika. Ten of the cases were in patients who had received treatment with other drugs a year or more previously and one of the four new patients had a history of drowsiness for about one year before admission.

Pentamidine was given by a daily injection for eight days either intramuscularly or intravenously. It was first tried by the intramuscular route in amounts varying from 1.6 to 5.15 mgm per kgm of body weight which represented doses of one or two grains; in one case three grains. No reaction or discomfort was caused. Intravenously a dose of more than 2.0 mgm per kgm produced headache and severe rigors.

The observation period varied from a few weeks to a few months and immediate results were judged by examination of the cerebrospinal fluid obtained by lumbar puncture.

The author concludes that pentamidine certainly reduces the cell count of the cerebrospinal fluid in late cases; in cases which are not very advanced the clinical state shows real improvement but he considers that a follow up period of at least two years is necessary to establish its real value. In two cases tryparsamide produced rapid clinical improvement after pentamidine had failed. The author suggests that at least 2.0 mgm per kgm of body weight should be given preferably intravenously and two courses of eight injections with a week's interval might be highly effective except in cases verging on coma. [See also this *Bulletin* 1942 Vol 39 p 532 1943 Vol 40 p 370] J F Corson

ROSENTHAL (Sanford M) The Trypanocidal Action of 3 Amino 4-Hydroxyphenyl Arsenious Oxide (Mapharsen) administered Orally with Glutathione—*Jl Pharm & Experim Therap* 1942 Dec Vol 76 No 4 pp 358-362

As is well known trivalent arsenobenzols *e.g.* neoarsphenamine are poorly absorbed when given by mouth possibly owing to their colloidal nature and little therapeutic effect is produced. The author investigated whether the soluble compound mapharsen would be more effective if given in this way; glutathione was given simultaneously to diminish the toxicity. The experiments were made with mice infected with *T. equiperdum*. The drug was given by stomach tube on the second day after inoculation with trypanosomes. The maximum tolerated single dose of mapharsen was 0.15 gm per kgm (1 mouse out of 10 died) but when the mapharsen was mixed with 5 mol glutathione the maximum tolerated dose was 1.0 gm per kgm. The maximum tolerated dose of mapharsen given intravenously is 0.025 gm per kgm. The curative single dose of mapharsen given orally was 0.04 gm per kgm and that of mapharsen plus 5 mol glutathione was about 0.06 gm per kgm. The curative dose of mapharsen given intravenously was 0.004 gm per kgm. Thus when mapharsen is given orally with glutathione the chemotherapeutic index (max tol dose/curative dose) is $1.0/0.06=17$ as compared with an index of $0.025/0.004=6$ when it is given intravenously. In preliminary experiments with

rabbits infected with syphilis the oral administration of mapharsen caused disappearance of the chancre but spirochaetes persisted in the inguinal lymph nodes
F Hackin

DAVIS (Dorland J) MCGREGOR (Theodore) & DESHAZO (Thelma)
Triatoma san muisga (LeConte) and *Triatoma ambigua* Neiva as
Natural Carriers of *Trypanosoma cruzi* in Texas—*Public Health*
Rep 1943 Feb 26 Vol 58 No 9 pp 353-354

Hitherto six species of *Triatoma* in the United States have been found infected naturally with *Trypanosoma cruzi* namely *T. protracta*, *T. p. woodi*, *T. uhleri*, *T. gerstaeckeri*, *T. heidemannii* and *T. longipes*. Nearly 30 years ago BRumpt showed that *T. san muisga* was infectible experimentally and three years ago PACHAIVAN showed the same for *T. ambigua*. The authors have recently examined large numbers of *Triatoma* of various species from different parts of Texas some from private houses others from nests of the wood rat *Neotoma micropus*. Faeces expressed from specimens of *T. san muisga* from Matagorda and Dimmit Counties and *T. ambigua* from Uvalde County during life were found to contain tritrichidia and metacyclic forms and were proved to be infective to young laboratory reared desert mice *Peromyscus eremicus*. Trypanosomes were present in the blood in small numbers in the second week after intraperitoneal inoculation and after four weeks in large numbers one or two in each microscopic field and the heart muscle revealed the characteristic leishmanial forms. These two species must therefore now be added to the other six as naturally infected
H Harold Scott

LEISHMANIASIS

COLONIEL (L) Au sujet du bouton d'Orient en Algérie [Oriental Sore in Algeria]—*Arch Inst Pasteur d'Algérie* 1941 Sept Vol 19 No 3 pp 358-359

Three cases are reported one from Gouraya (Department of Algiers) one from the Department of Oran and one from Algiers itself. The author points out that this affection may be contracted anywhere in Algeria even in Algiers itself
C H

PARROT (L) Notes sur le phlébotomes XXXI —Présence de *Phlebotomus perfilovi* dans la banlieue d'Algérie [The Presence of *P. perfilovi* in the Outskirts of Algiers]—*Arch Inst Pasteur d'Algérie* 1941 Sept Vol 19 No 3 pp 360-361 [14 ref.]

P. perfilovi (*P. macedonensis*) has previously been found in the Atlas mountains and other high places of Algeria but has not been discovered in the outskirts of Algiers together with *P. sergenti*, *P. perniciosus*, *P. longipes*, *P. arsiensis* and *P. parroti*. It is also found in the Crimea, Macedonia, Palestine, Crete, Malta, Hungary and Italy where it is regarded by VANNI [this *Bulletin* 1940 Vol 37 pp 377-379] as a vector of oriental sore
C H

FEVERS OF THE TYPHUS GROUP

GEAR (James) *The Typhus Group of Fevers*—Reprinted from *Leech*
1941 Oct Vol 12 No 2 9 pp

This is an admirably clear and succinct account of the chief features of the types of typhus fever seen in South Africa. The classification according to the arthropod vectors is regarded as being the most useful in practice. The distribution of louse typhus in South Africa is related to climate not to the vector which appears to be just as plentiful in the warmer as in the colder parts of the country. The head louse is considered to be an effective vector. The balance of evidence is opposed to the view that epidemics can originate from the murine type of *Rickettsia* because this retains its characteristic features in spite of all efforts to transform it to the human type.

Clinical diagnosis is not easy in dark skinned persons in whom the rash is difficult to detect.

In tick bite fever the South African variety of tick typhus the primary sore and regional lymphadenitis are often absent especially in severe cases. The animal hosts have not been detected but probably are rodents of the veld. The striped mouse and the gerbille are suspected. The dog is believed to be a conveyor of infected ticks rather than a reservoir of infection. In most cases infection is conveyed by larval ticks which are so small as to escape attention. Nymphs and adults are usually noticed before becoming attached. The primary sore appears three or four days after the infecting bite and the fever three or four days later. The rash appears on the third to the fifth day of the fever and is generally more pronounced in severe attacks. In mild cases there may be only a few raised papules. In severe attacks there is a profuse maculopapular rash and dusky mottling of the skin. The palms, soles and face are involved. The duration of the fever may be one to seven days in mild cases but may be as long as 14 days. The average case lasts 10 days. The fever is usually intermittent. The mortality rate is one or two per cent.

Agglutinins generally appear after the tenth day. *Proteus* O12 is agglutinated on the average to the same titre as *Pr* O19. *Pr* O1A is often agglutinated but only at a low titre. Cases of fever with agglutination of *Pr* O12 only are almost certainly tick bite fever. The average titres of agglutination are relatively low but in some cases the reaction does not differentiate tick bite fever from louse typhus or flea typhus.

[The table is on the lines already adopted by the reviewer but it contains additional useful information and so is reproduced.]

It will be seen that the louse borne and flea borne typhus fever of South Africa are shown as having the same serological and other characters as the typhus fevers transmitted by corresponding vectors in other parts of the world so that the author does not subscribe to the view that these South African fevers belong to different antigenic groups from louse typhus and flea typhus occurring elsewhere.

Since this table was prepared CASTAÑEDA has shown that there is a pronounced degree of cross immunity between the Rocky Mountain variety of tick typhus and both murine and classical typhus.

Brill's disease could properly be included as a form of louse typhus. Tabardillo is mentioned as a synonym of flea typhus but the name cannot be regarded as applying only to the flea borne disease. It has

been widely used of the fevers of the typhus group occurring in Mexico and in many cases the vector is uncertain

In the table the query mark in connexion with cross immunity between mite typhus and mite typhus is probably a slip LEWTHWAITE and SAVOOR have shown [this *Bulletin* 1940 Vol 37 pp 576-847] that the two chief types of mite typhus immunize against each other and are probably identical]

John W D Megaw

MACCHIAVELLO (Atilio) & CIFUENTES (Osvaldo) El tifo exantemático en Chile [Exanthematic Typhus in Chile]—*Rev Chilena de Hig y Med Preventiva* 1942 Sept Vol 5 No 2 pp 109-129 [Bibliography]

Under the name exanthematic typhus the authors include louse borne and flea borne typhus the two fevers of the typhus group known to occur in Chile

Epidemics of louse-borne typhus have occurred in Chile at intervals ever since the middle of the sixteenth century The recent epidemic periods were 1918 to 1925 and 1932 to 1939 From 1918 to 1939 more than 87 000 cases and about 18 500 deaths have been officially notified

Flea borne typhus was first recognized as occurring in Chile in 1932 but it seems to be relatively unimportant and Macchiavello does not believe that it constitutes a reservoir of infection of the louse borne disease The review and the bibliography of nearly 80 articles show that Chilean medical men have studied every aspect of louse borne typhus the senior author Macchiavello has made 19 contributions to the literature of the typhus group

Mention is made of the unfortunate episode of 1935 when 227 attacks of murine typhus with five deaths occurred in a group of 550 persons after inoculation with Blanc's vaccine The lack of enthusiasm for protective inoculation on the part of the people of Chile is said to be due to this event

[The article is of great interest but it cannot well be summarized most of the work that is dealt with has already been reviewed in this *Bulletin*]

John W D Megaw

FINDLAY (G M) REID (R D) & MALGRAITH (B G) Typhus in the Gold Coast—*Jl Roy Army Med Corps* 1943 Mar Vol 80 No 3 pp 134-141 With 1 chart [10 refs]

A case of fever with symptoms which were regarded as suggestive of murine typhus was investigated in Accra Gold Coast in June 1942 The illness began with tenderness and slight enlargement of a lymph node in the right axilla there was no definite scar but a red patch about 2 cm in diameter was found on the back of the right shoulder On the second day the temperature rose to 101 F and there was pain in a femoral lymph node From the chart it is seen that the fever was irregularly remittent from the 2nd to the 8th day the temperature on most days rising once or more often twice daily to about 103 F and falling on five of the six days to a minimum of between 99 and 100 F Early on the 9th day there was a sudden fall from 103 to normal and during the next three days the fever was irregularly intermittent never rising above 101

There was a papulo-erythematous rash which appeared on the 4th day and was still faintly visible after a hot bath till the 3rd or 4th week of convalescence. The rash was more prominent on the trunk than on the limbs.

The Weil-Felix reaction was negative on the 5th day but on the 17th day the titre to *Proteus OX19* was 1-100 and to *Pr OX2* it was 1-250. Two guinea-pigs inoculated with serum taken on the 6th day had no obvious reaction and two inoculated with ground up blood clot had had no reaction by the 8th day when one of them was killed the other had a febrile reaction on the 11th day and was killed two days later to provide material for sub-inoculation into two other guinea-pigs which reacted with fever on the 5th and 6th day. No scrotal reaction had yet been observed but two animals of the 3rd passage had typical crota reactions and Rickettsiae were found in the haemorrhagic tunica. After six passages the incubation period in the guinea-pigs gradually became longer and by the 10th passage the infection had apparently died out.

Similar types of Rickettsiae were isolated from some of the black rats (*Rattus attus*) of the immediate neighbourhood and from the giant rat *Cricetomys gambianus*. With these strains also crota reactions did not appear till the 3rd guinea-pig passage at earliest. Specimens of *Aopsylla cheopis* collected from giant rats were triturated and inoculated into guinea-pigs which gave febrile reactions with incubation periods of five to six days. The black rat strain gave cross immunity with both the human and the giant rat strain.

The probable source of infection was a black rat and the vector the rat flea *A. cheopis*. Ticks were taken into consideration because the patient had been in the habit of removing them from a cat. Blood from the cat and suspensions of the tick found on it caused no reaction in guinea-pigs. It was thought possible that the cat might have harboured rat flea or cat flea which are possible vectors.

The Rickettsiae approximated to the murine type but there are doubts whether the responses in experimental animals are decisive criteria on which to base a classification of these organisms.

[This case is a further example of the difficulties so often encountered in the differential diagnosis between the fevers of the typhus group. The investigation in this case was much more thorough than is usually practicable. In ordinary conditions the guinea-pig reaction would probably have been regarded as negative and no further investigation would have been considered necessary.] J. I. H. D. Mc W.

MOUSTARDIER (G). Sur un cas de fièvre typho-exanthématique observé en A. E. F. [A Case of Exanthematic Typhus observed in French Equatorial Africa]—*Rev. Sci. Méd. Pharm. et Vét. de l'Afrique Française Libre* Brazzaville 1942 Oct Vol 1 No 2 pp 21-28.

This case is described as one of typical typhus fever in a European patient living in Brazzaville in French Equatorial Africa where fevers of the typhus group are said to be fairly common.

The onset was sudden the temperature ranged between 37.6 and 39.0 C for the first four days then for four days the fever was of the high continued type. The temperature began to fall by lysis about the eighth day and reached normal on the 15th day.

A rash appeared on the eighth day first on the front of the chest and abdomen then all over the body including the palms of the hands but not extending to the face. The rash was of the discrete maculo papular type. The Weil Felix reaction was positive to *Proteus* OX19 1-3 500 and to *Pr* OXL 1-50 but was negative to *Pr* OY2 and *Pr* OXA all on the 19th day.

This reaction and the absence of a *tache noire* were opposed to the diagnosis of boutonneuse fever. A tick infested dog occupied the same room as the patient but suspensions of the ticks caused no reaction in a guinea pig inoculated intraperitoneally. The quarters were infested with rats but none of these could be captured.

The infection was regarded as murine and was suspected of having been acquired by the ingestion of food or drink contaminated by the dejecta of rats.

The author has also observed several cases of an eruptive fever among Europeans in Brazzaville nearly all in the rainy season from February to June. A maculo-papular rash appeared on the fourth day first on the forehead and then on the body and limbs. In all the typical cases a small black necrotic patch was seen on a lower extremity sometimes but not always associated with enlargement of the corresponding lymph nodes. The fever lasted 12 to 14 days and ended by lysis. All the patients seem to have kept tick infested dogs but attempts to recover *Rickettsiae* from the ticks were unsuccessful and the agglutination reaction to *Pr* OY19 OXA OYL and OY2 was always negative.

The diagnosis was therefore uncertain but the disease may have been either the tick borne pseudo typhus of SAINT ANNA and NUTTALL or boutonneuse fever.

John W D Megaw

LAMPERT (H) Die Bewertung des weissen Blutbildes bei Fleckfieber kranken [The Significance of the Leucocyte Picture in Typhus Fever]—*Deut Med Woch* 1943 Jan 8 Vol 69 No 1 pp 12-15 With 3 figs

During the present war the author has observed 300 cases of typhus fever. In six severe cases three of which were fatal he has made detailed observations of the leucocytes from day to day. The findings in the three cases with recovery are illustrated by elaborate graphs.

The general trend in these cases was towards a pronounced increase in the total and differential polymorphonuclear count during the fever with a fall to normal in convalescence. The lymphocyte count was relatively low during the first few days but rose temporarily towards the end of the fever. The lowest total leucocyte count observed was 7 200 (on the 13th day) and the highest 26 100 (on the 12th day) in a different case.

During the first few days there was a pronounced shift to the left in the Arneth Schilling index and on the strength of his observations the author concluded that when at this stage the percentage of the polymorphonuclears with rod shaped (stabkernige) nuclei was 15 to 25 there was a strong suspicion of typhus when it was 25 to 40 an absolute diagnosis of the disease could be made in severe cases of fever.

The index does not help in prognosis it tends to return towards normal before death as well as in convalescence it is regarded as showing the strength of the defensive reaction rather than of the intoxication.

[The paper will be of interest chiefly to specialists in haematology who must judge for themselves whether the leucocyte picture has the diagnostic significance attributed to it by the author]

John W D Meaw

GOETTERS (W) Serologische und tierexperimentelle Beobachtungen bei Fleckfieber [Observations on Serological and Animal Experimental Tests for Typhus Fever]—*Ztsch f Immunstat* "Experim The ap 1942 Nov 12 Vol 102 No 4 pp 299-312 With 2 figs

The author begins by making the claim that hygienic measures and timely inoculation by Weil's vaccine have kept the number of cases of typhus fever at a surprisingly low level during the present war. The announcements of actual figures is forbidden so that in this paper percentages are given.

The effectiveness of the vaccine is shown by the small percentage of attacks (6 per cent) in vaccinated persons exposed to great risk and by the mildness of the attacks that did occur. Weil Felix reactions were carried out in a number of persons for three months after inoculation in about two-thirds the reaction was negative throughout the period in the rest weak positives were first observed after two weeks titres of 1-100 were reached after four or five weeks and titres of 1-100 or over after twelve weeks. No titres in excess of 1-400 were seen. There was no association between the strength of the reaction and the degree of protection afforded by the vaccine.

The following figures show the times of first appearance of the Weil Felix reaction in a number of cases of typhus fever: 4th day in 4.9 per cent, 5th day in 8.2 per cent, 6th day in 12.2 per cent, 7th day in 59.8 per cent, 9th day in 8.4 per cent, 11th day in 1.7 per cent and 13th day in 2.3 per cent.

In a large number of patients suffering from fevers other than typhus the Weil Felix reactions gave the following results: 84.4 per cent were negative, 11 per cent were positive 1-50, 0.9 per cent were positive at higher titres including two patients who reacted at 1-400. From one of the patients who reacted at the highest titre a strain of *Proteus* was cultivated from the urine but the serum of the patient did not react to his own strain.

In undoubted cases of typhus in persons who had received T A B inoculation the following other reactions were found: to *Bact typhi* titres of 1-400 to 1-800, to *Bact paratyphi m A* in 7.6 per cent at titres ranging from 1-100 to 1-400, and to *Bact paratyphi B* in 12.3 per cent in the same range of titres. *Bact typhi* titres (Breslau or Gartner strains) were agglutinated at titres of 1-100 to 1-400, in 14.1 per cent and dysentery bacilli mostly Flexner 1 at 1-50 in 2.5 per cent of the cases.

The dry blood agglutination test of Kudacke and Steuer is highly praised as a rapid preliminary test and as an easy method of making surveys of suspected communities but it is not regarded as supplanting the standard reaction. For the dry blood test suspensions of *Proteus O 119* in normal saline killed at 75°C and preserved by the addition of alcohol to make a strength of 25 per cent can be used. These keep

for several months. Dried cultures which are suspended in saline just before use are also satisfactory but suspensions of living cultures or of cultures to which formol has been added are not recommended.

The only animal experiments that are mentioned are intraperitoneal inoculations of 0.5 to 2.0 cc. of freshly drawn and defibrinated blood of the patients. In 10 guinea-pigs inoculated with blood taken between the fourth and the eighth days the average incubation period was 8.9 days and the febrile period eight days. In six guinea-pigs inoculated with blood taken between the 11th and the 13th days the average incubation period was 14 days and the febrile attack 13.5 days.

Special attention is called to the great frequency of mild and larval attacks in communities living in areas where the disease is persistently endemic. In such communities typhus fever is a common disease of childhood like measles or scarlatina and it follows that many of the inhabitants of the places concerned have some degree of immunity against the disease.

John W. D. Megaw

DING (Erwin). Zur serologischen und mikrobiologischen Diagnostik des Fleckfiebers. [The Diagnosis of Typhus Fever by Serological and Microbiological Methods]—*Ztschr. f. Hyg. u. Infektionskr.* 1942 Dec 31 Vol 124 No 5 pp 516-553 [12 refs.]

Repeated agglutination and other tests in 53 undoubted cases of typhus fever of which nine were fatal gave the following results.—In eight cases the Weil-Felix reaction was completely negative and in nine other cases it was positive in dilutions not exceeding 1-100. Positive reactions to *Bact. paratyphosum B* were observed in 29 of the cases and in 14 of these the reaction was positive also to *Bact. typhosum*; none of these reactions could be explained on the grounds of mixed infection, inoculation or previous attacks. Attempts were made to cultivate *Proteus X19* from the cerebrospinal fluid of typhus patients but negative results were obtained in 176 tests.

Some of the findings in the elaborate investigations were as follows.—In 127 tests the pressure of the cerebrospinal fluid was within normal limits in 63, low in 60 and high in 4; it tended to fall during the attack. The cell count was normal in every case.

In 10 of the 53 cases the cerebrospinal fluid as well as the serum yielded positive Weil-Felix reactions but there was no relationship between these positives and the severity of the attacks.

Three of the cases in which the Weil-Felix reaction was negative are reported in detail: two of these patients died and the diagnosis was confirmed at the autopsy. Four of the patients in whom the reaction was in titres below 1-100 died. Factors of place and time may be of importance in connexion with these results: in one group of 38 patients there were only six negative or weak reactions, one of which was in a fatal case, whereas in another group of 15 patients there were 12 such reactions, four in fatal cases. The anomalous reactions were much more frequent in severe attacks.

The various types of agglutination responses are shown in the table.

The reactions to *Bact. typhosum* and *Bact. paratyphosum B* were usually in titres of \pm 1-100 but sometimes rose to \pm 1-400; there was no correlation with the severity of the attack.

In the course of 413 agglutination tests flocculation of the serum when mixed with normal saline was seen on 29 occasions, usually in

Number of case	P.O. & O.V. 19 (1-25 and 0-1)		Typhoid p	
	Blood	Cerebrospinal fluid	Blood	Cerebrospinal fluid
13	+	-	-	-
13	-	-	+	-
9	-	-	+	-
	-	-	-	+
	-	-	-	-
1	-	-	-	+
1	-	-	-	-
Total 53 (9 fatal)	45	10	31	16

cases in which high titre Weil Felix reactions occurred just before or just after the anomalous finding. Complement fixation reaction for syphilis were positive in 20 cases in the blood serum and in many cases in the cerebrospinal fluid. The Kahn test was positive 14 times in the blood and 4 times in the cerebrospinal fluid. The reactions were not related to the Weil Felix response or to the results of the double agglutination power. Such a large percentage of negative and low titre response is so extraordinary that the author does not refer to the possibility of a fallacy somewhere here.

Johannes D. Meier

GARD (Jan) Comparaison de résultats de la micro-réaction de (a) l'antidote L Ch Brumpt et de la réaction classique de Weil et Felix dans le diagnostic du typhus évanthématique. The Results of the Micro-Reaction of Castañeda and Silva as modified by L Ch Brumpt as compared with those of the Classic Weil Felix Reaction.—Bull. H. M. A. 1941 \ S Vol 1 pp 35-44 With 4 graphs

This paper of considerable importance as showing the degree of chance that can be placed on one of the best known of the rapid bedside test for typhus fever. The method consists in mixing on a glass slide a drop of finger blood with a drop of a suspension of a mixture of methylene blue and sterilized by formal. The mixture is spread (presumably so as to form a shallow pool) and is kept moving by titing the slide with a circular movement. In positive reactions the mixture instead of remaining of a uniform greenish brown colour becomes surrounded by a blue ring made up of the agglutinated stained bacilli. In most cases the reaction appears within

one or two minutes the latest reading is made at the end of four minutes. The suspension keeps well. The author uses a stock suspension which when diluted 20 times for the actual test gives a reading on the Vernes opacity scale of 50 to 60.

Of 200 healthy blood samples two were positive to each of the two tests. The results in a large number of known and suspected cases of louse borne typhus fever are given in detail in tables from which the following summary has been compiled—

	Total number of positive Weil Felix reactions	Number of these negative to the micro reaction
Weil Felix titre		
1-50 and 1-100	227	33
1-200 to 1-1 000 and over	1 121	9
	Total number of positive micro reactions	Number of those negative to the Weil Felix reaction
Micro reaction		
Positive in less than 60 seconds	1 033	1
Positive in 60 to 120 seconds	240	18
Positive in 120 to 240 seconds	73	21

In 140 cases the blood was negative to both reactions and in 1 306 it was positive to both.

Of the 40 cases in which the blood was positive to the micro reaction and negative to the Weil Felix 14 could be followed up and six of these became positive later to the Weil Felix test while four others were undoubted cases of typhus fever so that the reliability of the micro reaction compared favourably with that of the standard test.

There is obviously some degree of correlation between the rapidity of appearance of the micro reaction and the titre of the Weil Felix reaction—about three fourths of the cases in which the former reaction was positive in less than 30 seconds corresponded to a Weil Felix titre of 1-800 and over but on the other hand a positive occurring between 30 and 60 seconds was just as likely to correspond to titres of 1-200 or 1-400 as to those of 1-800 or over. Variations in temperature or in the richness of the suspensions did not explain this lack of correlation between the two reactions.

The general standard of agreement between the micro and the standard reactions was over 96 per cent and if account is taken only of cases in which the Weil Felix titre was 1-200 or over and of cases in which the micro reaction was positive within 60 seconds the agreement is almost complete.

Special advantages of the reaction are its simplicity, rapidity and freedom from risk to unskilled persons who can be quickly trained in the technique. The chief source of error is the occasional occurrence of auto agglutination of the red blood corpuscles which may give

to the formation of a red rather than a blue ring this occurs chiefly in cold weather and can usually be prevented by warming the slide beforehand. Coagulins to typhoid were found in even case in two of which the patients had received T A B inoculation.

The author concludes that in reliability and sensitivity the reaction is equal to the classic Weil Felix reaction. *John W. D. McFar*

AKREN (Walther) Verwendung von Trocknannten bei der serologischen Schnellmethode zum Fleckfiebernachweis [The Use of Dry Antigen in the Rapid Serological Diagnosis of Typhus Fever]—*Deut. f. Hyg. u. Bakt.* 1942 Vol 128 No 6 pp 281-283 10 ref

UING STEUER dry blood agglutination test [the *Bulletin* 1941 Vol 39 p 37] the author has tested the activity of suspension of *Prostov* made from dried culture as compared with those made from fresh culture and has found that the results were closely comparable.

The growth from 10 to 20 hour culture on agar plates is collected with a loop and dried at 37 C for one day and then reduced to a fine powder. A little of this is picked up with the point of a knife and mixed with 10 cc normal saline. By shaking at intervals for ten minutes a uniform suspension is made and filtered through filter paper. The opacity should correspond with that of suspensions used for the *Widal* test. Tests were made with 29 sera which had been found to give positive *Weil Felix* reactions in titres ranging from 1-50

1-1600 and over. The results are shown in a table in which they are compared with each other and with the standard *Weil Felix* reaction. The dry antigen has been kept already for three months without deterioration.

The author points out that the use of dried bacterial cultures for agglutination tests is not a new idea. In 1921 J. W. WILSON made a stable and sensitive preparation of this kind by drying bacterial cultures *in vacuo*. *John W. D. McFar*

SCHAFER (Walther) Ueber eine Methode zur Schnell-diagnose des Fleckfiebers am Krankenbett [A Rapid Method of Bedside Diagnosis of Typhus Fever]—*Deut. Med. Woch.* 1943 Jan 22 Vol 69 No 3 pp 63-64

This is still another bedside modification of the *Weil Felix* test. Dried smear of a suspension of *Prostov* are made on glass slide and drops of the serum to be tested are added to these.

A 20-hour agar slope culture is mixed with 2 to 3 cc. of equal parts of 96 per cent alcohol and normal saline and kept overnight at 37 C.

Two drops of the suspension are placed separately on a glass slide and dried in the incubator. A drop of the serum is added to one of the smear and mixed with it after a minute by rubbing with the corner of a glass slide. In positive cases the clumping is easily seen with the naked eye especially if the slide is held in a good light against a dark background.

Clumping occurs immediately or at latest within ten minutes. To the other smear a drop of normal serum is added to serve as a control and to eliminate the confusion that may result from fragments of the dried smear.

The reaction is purely qualitative and is used as a preliminary to a standard Weil-Felix test. A positive result corresponds to a Weil-Felix titre of 1:50 or over.

John W. D. Megaw

BUSVINE (J. R.) The Toxicity of some Common Fumigants to Body Lice—*Bull. Entom. Res.* 1943 Apr Vol 34 Pt 1 pp 19-26 With 1 fig [Summary appears also in *Bulletin of Hygiene*]

The author considers two situations under which it is desirable to know the effectiveness of fumigation against lice. One is where cases of typhus have occurred in a house and where this is being treated with the common fumigants hydrogen cyanide or sulphur dioxide. The other is where clothing infested with lice and eggs is treated on a small scale in a bin. As the result of experiments in the laboratory and in rooms it was found that lice have about the same resistance as bed bugs to the fumigants tested. Under practical conditions 16 oz. of hydrogen cyanide per 1 000 cubic feet for 6 hours at 4 C. or 13 oz. for 2 hours at 25 C. will kill lice and eggs. 2 lb. of sulphur per 1 000 cubic feet for 12 hours at 20 C. is also satisfactory. These fumigants are not considered suitable for clothing. Hydrogen cyanide because of the danger. Sulphur dioxide because it is likely to damage fabrics. For the fumigation of garments in bins the solids naphthalene and paradichlorobenzene are very slow and unreliable. Liquids such as heavy naphtha or trichlorethylene however applied at the rate of 32 cc. in the bin for 24 hours (equivalent to 2 gallons per 1 000 cubic feet) killed all lice and eggs.

J. B. Wigglesworth

SMITH (D. J. W.) Studies in the Epidemiology of Q Fever 11—Experimental Infection of the Ticks *Haemaphysalis bispinosa* and *Ornithodoros* sp. with *Rickettsia burneti*.—*Australian J. Experim. Biol. & Med. Sci.* 1942 Dec Vol 20 Pt 4 pp 295-296

Haemaphysalis bispinosa, a tick which infests cattle in the coastal districts of southern Queensland and northern New South Wales has been shown to be capable of transmitting Q fever from infected laboratory animals to healthy animals by its bite. Ticks infected in the larval stage were infective in the nymph stage and those infected in the nymph stage were still infected in the adult stage but infected adults did not transmit infection to laboratory animals on which they were fed. This failure was attributed to the fact that the ticks fed reluctantly, none of them becoming engorged.

The *Rickettsiae* in the infected ticks were found in the lumen and lining epithelium of the gut; those in the cells were seen only in the cytoplasm, not in the cell nuclei.

This tick is regarded as a probable transmitter of infection from cow to cow and may possibly transmit infection from bush animals to cattle.

Ornithodoros gurneyi, collected in a cave in North West Queensland became infected by biting infected guinea-pigs and individual specimens of the ticks were found to harbour live *Rickettsiae* for 129, 135 and 535 days after the infecting feeds. The infected ticks failed to transmit infection to guinea-pigs.

In a footnote it is stated that the paper is incomplete and has been published because the investigations into the entomological aspects of Q fever have been suspended.

John W. D. Megaw

ZEMP (F Eugene) Q Fever.—*Jl Amer Med Assoc* 1943 Mar 13
Vol 121 No 11 pp 828-830 [20 refs]

In July 1942 a girl aged 18 suddenly became ill with high fever a week after returning from a visit to the mountainous country of western North Carolina. There is no mention of a bite by a tick but the patient is said to have gone on a number of hikes. The fever lasted 45 days and was complicated by mild neuritis of the legs. During the first fortnight there were rather severe chills every day and during this period the maximum daily temperature was between 104 and 105.8 F the minimum was never as low as normal. During the next two weeks the maximum ranged between 102 and 103.8 and there was a daily fall to normal. The fever then subsided gradually. There was no rash.

The earlier laboratory tests of various kinds were negative except for a positive Weil Felix reaction (1-50) about the sixth day. Blood was sent on the 20th day to the U.S.A. Public Health Laboratory and was found to give a positive complement fixation reaction (1-4) to Q fever. It was then negative to the Weil Felix and other tests which included complement fixation tests to Rocky Mountain spotted fever and endemic typhus.

Although the patient was not regarded as being critically ill at any time this was an exceptionally severe attack of Q fever. The author by implication regards the disease as a form of tick borne typhus a suggestion already made by WILCOCKS in this *Bulletin* and one that appears to be justified by the known facts.] *John H. D. Mead.*

DYER (R. E.) Q Fever. [Correspondence].—*Jl Amer Med Assoc* 1943 May 29 Vol 122 No 5 p 331

In this note Dyer refers to the paper by ZEMP (above). Dyer in whose laboratory the serological tests in this case were carried out points out that the titre of 1-4 at which the complement fixation was positive is not regarded as significant. In the second place Zemp does not mention that agglutination was positive against *Bact. typhosum* at a titre of 1-50 two and a half weeks after onset. Dyer considers that the case resembles rather the group of long continued fevers than a Rickettsial disease.

C II

YELLOW FEVER.

LEWIS (D. J.) Mosquitoes in relation to Yellow Fever in the Nuba Mountains Anglo-Egyptian Sudan.—*Ann Trop Med & Parasit* 1943 Apr 30 Vol 37 No 1 pp 63-76 With 1 map & 3 plates [14 refs]

An account of the species of mosquitoes found in the Nuba Mountains. This includes even species known to be potential vectors of yellow fever viz *Aedes arabiensis*, *A. lateralis*, *A. simpsoni* var. *luteus*, *A. tritaenatus*, *A. m. tallicus*, *A. taylori* and *Tae. arhinchus* *afroca*.

Their estimated importance in the epidemic of 1940 [see *Ann Trop Med & Parasit* 1942 Vol 39 p 69] deduced from a study of their prevalence and habits is indicated in the following table—

Species	Estimated rôle	Notes on adults
<i>Aedes villatus</i>	Very important	Abundant on and near hills
<i>furcifer*</i>	} Important	Numerous almost everywhere
<i>taylori</i>		
<i>luteocephalus</i>	Of some importance on and near hills	Common on and near hills
<i>metallicus</i>	} Important in some villages	Common near breed in places
<i>aegypti</i>		
<i>simpsoni</i> var	} Of little or no importance	Uncommon
<i>lili</i>		
<i>Taeniorhynchus africanus</i>		

Not a proved potential vector

There is little information which throws light on the cause of this epidemic but the Moro Hills region where it probably started was the only area in which *A. villatus* was found breeding at the time of the outbreak and also there was a higher index of *A. aegypti* than in most places visited. One of the most striking characteristics of the mosquito fauna of the Nuba Mountains is the predominance of *Aedes* 99 per cent of all mosquitoes caught while biting belonging to this genus.

Various reasons are given for considering that *A. aegypti* was probably of little importance as a carrier except in certain places. Anti mosquito measures are impracticable in the greater part of the district but near the towns the control of vectors does not present so many difficulties.

R Hindle

CORADA REDONDO (Angel) Fiebre amarilla en Kogo (Abril ano 1941) [Yellow Fever in Kogo (Spanish Guinea) 1941]—*Medicina Colonial* Madrid 1943 Apr 1 Vol 1 No 4 pp 243-279 With 11 figs

The author sets forth in some detail the historical background of our present knowledge of *Aedes aegypti* transmitted yellow fever. He then reports the clinical data on six cases of acute fever which occurred in Europeans in Kogo in March and April 1941. Four of the cases were fatal. Mainly on the basis of the symptoms and clinical signs the author concludes that all six persons had yellow fever. Autopsy studies were carried out on an unspecified number of fatal cases. No adequate description of the microscopic examination of the liver is given.

The results of 25 mouse protection tests on sera collected in or near Kogo are as follows: of five individuals of European origin all were negative; of 20 natives tested eight gave positive tests and one inconclusive; the others were negative. These mouse tests were carried out in the Yellow Fever Institute at Entebbe Uganda. [The ages of the individuals, the length of their residence in this district and the basis of their selection are not stated so it is impossible to interpret the full significance of this demonstration of immune individuals in the Kogo region. One can only conclude from this report that the diagnosis of yellow fever in this outbreak has not been established beyond doubt.]

Hugh H Smith

EMMETT (John E.) Yellow Fever A Survey to the Present—*U S Nat Med Bull* 1943 Mar Vol 41 No 2 pp 575-593 With 4 figs [31 refs]

DENGUE SANDFLY FEVER

WALKER (A S) MEYERS (E) WOODHILL (A R) & McCULLOCH (R N)
 Dengue Fever—*Med J Aust* 1 1942 Sept 1 29th Year Vol 9
 No 11 pp 23-28 With 4 figs

SHEE (J C) A Clinical Sign in Sandfly Fever—*Indian Med Gaz*
 1942 Dec Vol 77 No 12 p 732

Varying degrees of choking of the optic discs were seen in 27 out of 30 cases of sandfly fever in three exceptionally mild cases it was absent. The condition ranged from blurring of the edges of the discs with distension of the retinal veins to papilloedema with swelling of 2 to 3 D. It was seen in the earliest stages in one case six hours after the onset but sometimes it was more pronounced on the second day. In severe cases it was still visible on the day after the crisis. It was regarded as being due to a rise in the pressure of the cerebrospinal fluid. The sign is claimed to be likely to help in diagnosis [but no mention is made of control examinations in other fevers]. In two cases in which the sign was present the diagnosis was uncertain in one of these the patient developed catarrhal jaundice 15 days later in the other subtertian malaria parasites were found. These were not included in the series though they were regarded as possible cases of sandfly fever with a consecutive or concurrent disease.

John W D Meaw

PLAGUE

BULLETIN DE L'INSTITUT D'HYGIENE DU MAROC 1941 N S Vol 1
 pp 79-131 —Rapport sur l'activité de Services de la Direction de
 la Santé Publique et de l'Assistance pendant l'année 1941 [pp
 121-123 —Petit, Plague in Morocco 1941]

The regions surveyed are those of Agadir Marrakesh and Casablanca. In Agadir the history of the outbreak of plague was the not infrequent one that a native who died in prison by the authorities took with him good belonging to individual dead of plague and infected a healthy community. Within a week of his own death the occurred 29 cases of plague of which 21 were fatal. The total number of cases bacteriologically confirmed in this region was 155. Plague in Casablanca was within the town and afforded proof according to the author of the correlation existing between the transit of grain and outbreak of plague in the town. The rôle of the flea which is well established for rural plague would appear here to be secondary [it is not easy to follow this reasoning the author does not amplify his statement]. Precautions taken were those which 50 years of experience of plague in Morocco have established as satisfactory early detection and isolation of the sick after disinsectization vaccination and disinsectization of contacts continuation of vaccination of the inhabitants so as to create a barrier among the healthy to the further spread of plague. Special precautions were taken and efficaciously for the protection of the great Moroccan port of Casablanca.

W F Hargis

HECHT (Otto) Las pulgas de las ratas en Venezuela (Nota preliminar) [The Fleas of Rats in Venezuela (Preliminary Note)]—*Rev. Sanidad y Asistencia Social* Caracas 1942 Dec Vol 7 No 6 pp 811-820 With 2 figs [26 refs]

Some 3 400 fleas were collected from trapped rats during 1939-40 in the city of Caracas capital of Venezuela and 95 per cent of these were *Xenopsylla cheopis*. This flea is recognized as the major vector of plague. No attempt was made to determine the species of host rat but previous investigation had shown that 98 per cent of the rats of Caracas were *Rattus norvegicus*. In Venezuela plague last appeared in the State of Aragua where there were 11 cases with eight deaths in 1939-40. The region is sparsely populated covered with forest and situated on the border between Miranda and Aragua States. Rats in this area are mainly field rats and the plague outbreak therefore must be regarded as sylvatic. Some 400 fleas from rodents of undetermined species were examined and 97.2 per cent proved to be species of the genus *Rhopalopsyllus*. So far the differences mainly in the form of the 9th sternite and arrangement of its setae have not been fully worked out. References are made to the species of *Rhopalopsyllus* which have been identified in the Argentine Brazil Ecuador and Panama. A bibliography provides the reader with necessary information as to original publications.

W F Harvey

CLARK (B Maule) & GOLDBERG (S) Pneumonic Plague Recovery in a Proved Case—*South African Med J* 1943 Feb 27 Vol 17 No 4 pp 57-60

In this epidemic of pneumonic plague 11 cases occurred all in natives and one patient recovered. The origin of the outbreak could not be traced but there was evidence of rodent plague in the district. There were no bubonic cases. Recovery from pneumonic plague is so rare that bacteriological proof of the causation is necessarily demanded. This was forthcoming. The patient was an old woman who lived in the same household as a family in which the two old parents two sons and a daughter died of pneumonic plague. She had been given 1 c.c. of live avirulent vaccine and 50 c.c. of anti plague serum as a prophylactic measure five days before the onset of her illness. Directly she became ill she was treated with large doses of serum and was given 400-500 c.c. in all intramuscularly and subcutaneously. Her symptoms resembled those of the other patients—pain in the chest frequent loose cough and thin frothy sputum which later contained bright red blood. Although culture of the sputum was negative proof of plague infection came from guinea pig inoculation by scarification.

This outbreak took place in a native location and vigorous control measures were adopted. These consisted in strict quarantine and vaccination with living avirulent *P. pestis*. [The vaccine was that of GRASSET (this *Bulletin* 1942 Vol 39 p 311) a mixture of the E V and Tjiwdeji strains]. Some 700 of the estimated population of 900 received vaccine treatment and concentrated serum was given to close contacts. The authors of the paper themselves received prophylactic treatment. 50 c.c. of serum intramuscularly and 1 c.c. of vaccine. The vaccine produced a mild local reaction with few if any general symptoms.

The serum treatment on the other hand was followed by pain in the buttocks a local rash with later constriction in the chest a loose cough and aching in the calf muscles In a week or 10 days later still there appeared a generalized urticaria

W F Harley

AMOEBIASIS

WESELMANN (Hans) Vorkommen von *Entamoeba histolytica* im Duodenum [The Finding of *E. histolytica* in the Duodenum]—*Deut Trop Ztschr* 1942 Sept 15 Vol 46 No 18 p 457

E. histolytica is usually found in the large intestine rarely in the lower part of the small intestine The author reports a case in which vegetative forms with typical appearance and ingested red cells were found in duodenal contents removed by duodenal sound together with characteristic cysts containing four nuclei Investigation by the sound was undertaken because it was thought that the chronic diarrhoea from which the patient suffered might have been due to *Giardia intestinalis* no amoebae were found in the faeces The finding of cysts in the duodenum had previously been reported by KOLLE and HERSCH but this is apparently the first time that vegetative forms have been recovered Treatment of the patient with emetine caused rapid disappearance of all forms

C II

COORAY (Gerald H) Two Rare Complications of Intestinal Amoebiasis—*Indian Med Ga* 1942 Dec Vol 77 No 12 pp 735-736 With 1 chart

Rupture of liver abscess into the bile duct is rarely seen A case is here reported in which the abscess ruptured into the bronchus and the patient coughed up chocolate-coloured pus which subsequently became bile stained

The second case was considered to be an example of primary amoebic infection of the lung The physical signs on admission suggested a pleural effusion at the left base There was no reasonable ground for suspecting hepatic amoebiasis since the liver was not tender and the X ray findings were negative The special features of the pleural fluid which indicated the diagnosis of amoebic infection were sterile chocolate-coloured fluid and the presence of Charcot Leyden crystals The diagnosis was fully established by finding both cystic and vegetative forms of *E. histolytica* in the faeces Blood examination was of value as it showed a polymorphonuclear leucocytosis The therapeutic test—the remarkable response to emetine injections—left no doubt that the effusion was due to amoebiasis The absence of evidence of liver involvement together with the fact that the effusion was left sided indicated that it was a primary infection

P Manson Bahr

RELAPSING FEVER

CLARK (Herbert C) Relapsing Fever in Panama —Reprinted from
Amer Assoc Advancement of Science Publication No 18 pp 29-
 34 [13 refs]

The author gives a useful summary of the present state of our knowledge concerning relapsing fever in Panama. The disease has a very low incidence as only 129 cases with three deaths are listed among 1 340 024 hospital discharges since 1906. These figures include the records of hospitals not only in Panama but also in Cuba Spanish Honduras Guatemala Costa Rica Colombia and Jamaica. The author is of the opinion that the disease may be more common among rural native children than these figures indicate since it is very infrequent for an adult rural native to acquire a severe attack. Non immune foreign white people visiting rural districts and occupying native huts are much more liable to become infected.

The local vectors are *Ornithodoros talaje* and *O. venezuelensis*. The former feeds on a great variety of hosts including mammals birds and reptiles as well as man. *O. venezuelensis* feeds especially on man and animals and is probably the chief transmitter.

Relapsing fever in Panama is apparently more prevalent among wild animals which probably act as a reservoir. Monkeys vampire bats opossums armadillos cattle horses mules and single examples of the grison and otter have all been found infected with spirochaetes apparently identical with the relapsing fever strain. Although rats would seem to be an obvious reservoir none has yet been found infected in nature. White mice rats and marmosets are the best animals for laboratory use the latter being extremely sensitive.

Natives except for young children show a high degree of tolerance which has probably been acquired in childhood. Foreign white non immunes develop severe acute attacks and the disease may run a long course unless diagnosis is made and satisfactory treatment is given. Rural native people seldom seek treatment. The name *Spirochaeta neotropicalis* has now been recorded for the spirochete of relapsing fever in Central and South America. *E Hindle*

KAMMER (Victor Maria) Sobita in the Treatment of Relapsing Fever
 a Short Study of Cases on the Upper Zambezi —*East African Med J* 1943 Feb Vol 20 No 2 pp 55-61 With 2 graphs & 1 fig

The author treated 19 cases of relapsing fever (*S. duttoni*) occurring in African natives on the upper Zambezi. Sobita (sodium potassium bismuth tartrate) was found to give very satisfactory results as out of 16 patients treated with this substance only four showed any febrile relapse and these recovered without further injections. The dosage used was for adults 0.2 gm sobita in 3 cc of water injected intramuscularly on two consecutive days and for children 2 to 10 years old 0.1 gm sobita in 2 cc water on two consecutive days. Infants under two years of age were given only one injection of 0.1 gm sobita. On the other hand a European patient treated with NAB and sobita failed to respond to the treatment and showed several relapses.

The author emphasizes that the credit for introducing sobita in the treatment of relapsing fever belongs to Dr John Todd who used it at the David Gordon Memorial Hospital Livingstonia Nyasaland [see this *Bulletin* 1930 Vol 27 p 694] *E Hindle*

YAWS AND SYPHILIS

ROTT (Glenn S.) Roentgen Manifestations of Bejel (Endemic Syphilis) as observed in the Euphrates River Valley—*Radiology* 1942 Mar Vol 38 No 3 pp 320-325 With 6 figs [13 refs]

This is the first radiographic study of the bone lesions of the non venereal syphilis of children previously studied by E. H. HUDSON—and from the same area Dier-ez-Zor (see this *Bulletin* 1936 Vol 33 p 966 1937 Vol 34 p 965)

All the subjects gave histories of bejel from 1 to 39 years previously and practically all were Kahn positive. Commonly accepted clinical criteria of heredosyphilis were absent. No radiographic evidence of cardiovascular involvement or Charcot's joints was found.

The main changes in the early (secondary) stage are periosteal and endosteal proliferation with or without areas of rarefaction in the shafts of long bones. The former may be localized or generalized on the bone and may be homogeneous or stratified; the latter is usually localized, well or ill defined and may involve the periosteal deposits and cortex (or also the medulla—probably in the tertiary stage). The density of the underlying cortex may be increased and medullary cavity may be obliterated.

In the later (tertiary) stage localized gummata with bony thickening and increased cortical density occur occasionally with sequestra. Gumma-like lesions involving the medulla may extend to the end of the bone and reach the joint. The usual but not frequent joint lesion is localized destruction of the articular cartilage with irregular erosion of the underlying epiphysis and related increased bony density. Generalized loss of bony density was absent.

Spontaneous healing results in localized or generalized bony thickening or deformity resembling sabre tibiae. All lesions respond readily to specific anti-syphilitic therapy.

With few exceptions, notably osteo-chondritis and neuropathic joint lesions, syphilitic bone lesions are comparable with those of bejel.

No mention is made of the number and ages of the cases studied; the incidence of bone lesions in bejel or the occurrence of ulceration of bone lesions through the skin. No reference is made to any paper on yaws bone lesions, many of which illustrate similar lesions. If non bejel cases can be investigated, a difficulty in such a community, it may be found that sabre tibiae are not related to bejel but possibly to dietary deficiencies. Unpublished work (by the reviewer) of yaws bone lesions in northern Uganda agrees very closely with this paper. No osteo-chondritis or neuropathic joint lesions were observed. This may be due to the age of acquired yaws and bejel cases compared with that at which syphilitic osteo-chondritis occurs in the first few weeks of life and to the absence or great infrequency of lesions of the central nervous system. In this yaws study it was found that the appearances of secondary and tertiary bone lesions depended more upon the age of the patient than upon duration of the infection. Tertiary lesions were sometimes seen in children 2-3 years after infection and were different from those seen in adults.

C. J. Hackett

LEPROSY

McCoy (G W) Observations on the Epidemiology of Leprosy—*Public Health Rep* 1942 Dec 18 Vol 57 No 51 pp 1935-1943

This paper brings the evidence regarding the incidence of leprosy in the United States up to date. The author emphasizes the tendency of the disease to disappear as an indigenous disease from parts of Europe (except in the south) and from north America (except in the States bordering on the Gulf of Mexico). Cases occur among those returning to other parts of the United States from leprosy infected countries but very few new infections can be traced to them. In New York only two cases have been discovered which might possibly have been infected there against 38 probably infected in other countries. The latter include 13 from the West Indies and from 3 to 1 only from 30 other countries. In a similar manner in the central north western States particularly Minnesota between 100 and 200 cases among Scandinavian immigrants to Minnesota gave rise to very few indigenous cases and none of 78 children born to them developed the disease. Among 40 closely investigated imported lepers only 7 contact cases have been traced and those 7 gave rise to only one doubtful case. The experience of California has been very similar with 475 leprosy cases imported mainly from Mexico the islands of the Pacific and from China between 1913 and 1940. 90 of these have died. Yet not more than 14 were probably infected within the State of California including two children of a leprous Japanese mother. The imported cases and deaths have declined in recent years with close examination of immigrants and the exclusion of lepers and because 165 of them have been sent to the Carville leprosarium. No less than 165 of the total cases came from Mexico 37 from the Philippines and 22 from China. On the other hand in the southern States of Louisiana Florida and Texas imported cases of leprosy have resulted in the establishment of foci of infection which show a strong tendency to perpetuate themselves apart from which leprosy transmission occurs so rarely in the U.S.A. that it is negligible from the public health point of view. *L. Rogers*

GILLET (R) Sur un nouveau cas de lèpre d'origine soudanaise observée à El Golea [A New Case of Leprosy from the Sudan observed in El Golea]—*Arch Inst Pasteur d'Algérie* 1940 Dec Vol 18 No 4 pp 471-476 With 2 figs on 1 plate [10 refs]

ESCALONA (Ernesto) Algunas consideraciones clínicas y terapéuticas sobre enfermos lepromatosos [Leprosy Clinical and Therapeutical Observations]—*Medicina México* 1943 Mar 25 Vol 23 No 432 pp 97-102

There is little fresh or original in this contribution. It is a paper read before the Dermatological Society of Mexico and briefly reviews the subject of leprosy the classification of cases and their treatment with chaulmoogra combined with benzocaine (90 parts chaulmoogra oil 10 of olive oil and 3 of benzocaine) as used at the Carville Leprosarium.

The author does not regard the erysipeloid leprotic manifestation as a form of the disease but as a true erysipelas due to secondary infection of a leprous lesion by a streptococcus which is promptly overcome by treatment with sulphanilamide. *H. Harold Scott*

BURSCHEIES (Karl) Zur Chemotherapie der Lepra [The Chemotherapy of Leprosy]—*Ztschr f Hyg u Infektionskr* 1942 Nov 9 Vol 124 No 3/4 pp 333-340 [23 refs]

After some introductory remarks on the incidence and causation of leprosy the author refers to the early work of BARROWCLIFF and POWER and others on the chemistry of chaulmoogra and hydnocarpus oils and to trials of metallic salts of their fatty acids without beneficial results in leprosy and to the failure of trials of propyl butyl and amyl esters etc. The work of WALKER and SWEENEY and of SCHÖBL on the *in vitro* action of preparations of chaulmoogra and hydnocarpus acids in inhibiting the growth of acid fast bacilli obtained from patients with leprosy is mentioned and the various suggestions made regarding the possible relationship between the chemical constitution or optical activity and therapeutic properties of the chaulmoogra series of fatty acids such as the closed carbon ring formula are discussed. The production of the ethyl esters by POWER and GORNALL and their use by others is also referred to. On the other hand ADAMS and his colleagues attribute the activity not to the chemical constitution saturated or unsaturated condition or optical activity but exclusively to the molecular weight and related physical properties.

To clarify the position animal experimental tests are necessary but as even hamsters have not proved suitable for regular infection with the human leprosy bacillus it is necessary to utilize rats infected with the closely allied Stefansky bacillus in order to test the activity of various organic acids against rat leprosy. White mice infected by injection with the rat leprosy bacillus can be used for testing preparations supplied by the dye industry such as dihydro-chaulmoogra acid cholesterol ester and dihydro-chaulmoogra acid benzyl ester etc. The author considers that the optical activity and other special features of the chaulmoogra fatty acids are not related to their activity so the way is opened up for the trial of other fatty acids of different chemical constitution in the experimental treatment of rat leprosy and he has especially worked at compounds of cinnamic acid such as cinnamoyl glycol acid-chaulmoogryl ester and other closely related substances of which he gives the formulae for details of which the original paper should be consulted by those interested in this highly technical subject. Further work on these lines he hopes may result in important progress in the treatment of human leprosy. Tests of their action should first be made *in vitro* on acid fast bacilli to ascertain which of the compounds should be further tried on rat leprosy and eventually on human leprosy. [See also this *Bulletin* 1940 Vol 37 p 45 1941 Vol 38 p 225] *L Roers*

FAGET (G H) JOHANSEN (F A) & ROSS (Hilary) Sulfanilamide in the Treatment of Leprosy—*Public Health Rep* 1942 Dec 11 Vol 57 No 50 pp 1892-1899

This is a report on a carefully controlled trial of the drug mainly in lepromatous cases after examinations of the blood and of the renal functions. Eight patients with lepromatous lesions and one with neural lesions were first treated with doses producing an average blood concentration of 9.0 m.m. per cent in seven of these febrile reactions occurred and the course had to be stopped. In six of the above given

a second course and in 11 other patients the average blood concentration of the drug was 5.0 mgm but in six high fever necessitated stopping the drug. Two patients were dangerously ill but recovered. Some degree of anaemia occurred in all and leucocytosis in many. The authors conclude that the drug is useful for secondary infections but not as a curative remedy for leprosy lesions.

L. Rogers

GRASSET (E) & DAVISON (A. R.) Antigenic Treatment of Leprosy by means of a Non Acid Fast Variety of Tubercle Bacillus (N.A.C.) — *South African Jl Med Sci* 1942 Nov Vol 7 No 4 pp 236-244

This is a report on a careful trial in leprosy of an antigen prepared from a non acid fast variety of tubercle bacillus referred to as N.A.C. which had previously been recorded to be of value in the treatment of certain tuberculous infections by Grasset who obtained it by culture in a liquid Sauton medium from a bovine strain of tubercle bacillus in 1934. This modified tubercle bacillus stains by the Gram and Much methods but does not retain the Ziehl-Neelsen colouration. In tuberculosis an emulsion of this strain when injected is claimed to produce fibrotic reaction with beneficial therapeutic effects. Tuberculin has previously been used in leprosy without definite beneficial results.

The present authors selected 20 neural and 20 lepromatous cases including representatives of each type and sub type of leprosy and they compare the results with those of other treatment in 24 neural cases selected at random. In the first place they report that no benefit resulted in the lepromatous cases which are therefore excluded from further consideration. The neural lesions included raised red macules, flat red or pink macules and grey granular macules; patients whose nasal or skin smears were showing or had shown *Mycobacterium leprae* but whose skins were normal were also included. Fifteen of the 20 cases had shown leprosy bacilli at some time yet all of them became negative during the treatment with the exception of one patient who died of cerebral haemorrhage and another of pneumonia. Moreover in 16 cases the skin lesions became absorbed. In contrast the 24 control cases showed prolonged absence of the leprosy bacilli in only four and four showed absence of activity but in the rest the skin lesions persisted. The N.A.C. was injected bi-weekly in doses rising from 0.5 to 10 cc with very slight and passing reactions but at the end of three months no change was evident in the external manifestations so at the patients' request the routine intradermal injections of iodized esters of hydnocarpus were resumed and the N.A.C. continued as before. At the time of reporting the 15 improved cases had been clinically and bacteriologically negative for a minimum period of 11 months. The addition of N.A.C. to hydnocarpus esters therefore appears to be worthy of further trial in positive neural cases of leprosy.

L. Rogers

HELVINTHIASIS

JAFFÉ (Werner) Leche de Higueron [The Sap of Fig Trees (as an Anthelmintic)]—*Rev. Sanidad y Asistencia Social* Caracas 1942 Dec Vol 7 No 6 pp 837-846 [15 ref.] English summary

- (1) The sap of fig trees which is used as an anthelmintic is called leche de higueron
- (2) It has been fractionated to establish the active agent which has proved to be only the proteolytic ferment ficin
- (3) The effect on the parasites is that the ferment digests them
- (4) The toxicity has been preliminarily determined on mice and proved to be faint
- (5) The genus of the fig trees is difficult to be classified. More than half of the species of this genus are inactive because of the absence of the active agent ficin
- (6) An easy experiment to establish the presence of ficin in saps of unknown fig trees is described
- (7) The destruction of the ficin by diluted chlorhydric acid is demonstrated. The conclusion of this experiment is to apply simultaneously sodium bicarbonate and leche de higueron
- (8) The in vitro action on *ascaris necator*, *trichocephalos*, oocytes of human origin and *ancylostomum canis* has been examined. A positive effect has been obtained in each case

ENGELHARDT (J. C.) Bayer 205 in der Diagnostik der Blasenbilharziose, Bayer 205 in the Diagnosis of Vesical Schistosomiasis.—*Deut. Trop. Zeitschr.* 1941 Dec 15 Vol 46 No 24 pp 597-603

The author's work confirms LÜVERT's conclusion that intravenous injection of Bayer 205 provokes the production of eggs by *Schistosoma haematobium* (see this *Bulletin* 1939 Vol 36 p 62). The procedure can therefore be used for the diagnosis of those in whose urine pinned eggs cannot be found by repeated examination and also to find out whether all the trematodes have been killed by treatment with tartar emetic or foudadin. Lüvert used 3.0 Bayer 205 but the author found that a single intravenous injection of 1.0 Bayer 205 was enough to provoke with certainty the egg production, eggs being found in the urine of 66.7 per cent of his cases after this dose usually within 18 hours and sometimes within three hours. This dose is sufficient in practice. The few cases in which it does not provoke egg production contain only a few trematodes and are in the author's opinion without significance. Larger doses provoke only temporary egg production and may harm the patient especially if the disease has caused kidney damage.

The diagnosis of vesical schistosomiasis is discussed. Eosinophilia can only be taken as evidence if other helminth infestations can be excluded and these are common in areas where schistosomiasis occurs. Cystoscopy is often difficult under topical conditions but it must not be ruled out. The complement fixation reaction done with extract of the digestive gland of snails is a useful aid. So is the skin reaction done with extract of *Schistosoma*.

Half the author's patients (all old cases in contrast to the early cases treated by Kunert) were given an average total dose of 50 cc of foudain the remainder an average total dose of 1.3 gm of tartar emetic until no eggs were found in the urine or no granular or calcified eggs were seen. This was regularly so after a maximum dose of 62 cc of foudain or 1.9 gm of tartar emetic. If daily urine examination for 10 days revealed no eggs the patients had an intravenous injection of 1.0 [2 gm] Bayer 205 a second of 2.0 after 10 days and a third of 3.0 after another 10 days. The urine was examined after 3, 6 and 18 hours. In 86 per cent of patients erythrocytes were found in 20 per cent there was albuminuria after 1.0 Bayer 205 all showed bladder epithelium before treatment and this was increased after it this being ascribed to damage done by the trematodes in these old cases. In 70 per cent of the patients no eggs were found after all these provocative doses. After 1.0 Bayer 205 eggs reappeared in the urine in 20 per cent of cases although in 5 per cent of these there were only some dead eggs. After the second injection of 2.0 Bayer 205 eggs were found in 10 per cent of patients 5 per cent of these being positive for the first time. In 15 per cent of those cases which were positive after the first provocation the urine was negative after the second provocation and remained so after the third dose of 3.0 Bayer 205. After this third dose of 3.0 only 5 per cent of all the cases still showed living eggs. In one patient Bayer 205 caused an alarming inflammatory condition of the skin and mucosae.

G Lapage

VALENCIA PARPARCÉN (J) Tratamiento medico de la Schistosomiasis Mansonii en los adultos [Treatment of *S. mansonii* Infection in Adults] —*Rev Policlínica Caracas* 1942 Nov-Dec Vol 11 No 67 pp 293-307

LUBINSKY (G A) Die zweiten Zwischenwirte de Katzenleberegel (*Opisthorchis felineus*) in der Umgebung Kievs [The Second Intermediate Host of *Opisthorchis felineus* in the Neighbourhood of Kieff]—*Zent f Bakt* 11 Abt 1942 Nov 25 Vol 105 No 14/16 pp 255-257 [10 refs]

Rabbits and young cats were experimentally infested with this fluke by feeding them with the flesh of *Tinca tinca* (tench) *Chondrostoma nasus* and *Leuciscus idus* (Id or Nerling). The feeding of five other species of fish including *Abramis brama* (breana) and *Rutilus rutilus* (roach) did not produce infestations. All the fish used were bought in a place 6 km from Kieff where almost all the cats have the fluke. The degree of infestation of the Dnieper fish in the Kieff area is very low.

The largest focus of human opisthorchiasis is on the lower Dnieper (17.7 per cent of the fisherfolk at Krasno-Grigorievsk and 26 per cent at Golaya Prinstany). The fisherfolk of the middle and upper Dnieper are less commonly infested (1 per cent at Cherkazy and 1.5 per cent at Chernobyl). Other cases occur in the Donetz and Dnieper basins. In domestic animals the fluke occurs on the Rivers Bug and Ob.

G Lapage

LA MIER (Eugéno P.) & CASINELLI (J. F.) Diagnóstico del quiste hidático pulmonar en la expectoración incluida [Diagnosis of Pulmonary Hydatid from Sputum Examination]—*4th Univ. de M. d. C. y Es. especialidades* 1942 Nov Vol 21 No 5 pp 564-57 With 5 fig. (3 coloured)

In 1940 Professor La Mier first brought forward his suggestion that the recognition of minute fragments of hydatid wall could be particularly readily made by special staining of the sputum. In this article he returns more fully to the subject. Best's carmine is used and the chitin fragment shows out remarkably clearly. The effect is well seen if a portion of hydatid wall is fixed in a mixture of 10-12 per cent formalin 3-5 per cent acetic acid and embedded in paraffin. Best's carmine will stain cellular elements, granulations, glycogen and inclusion, but the hydatid membrane contains a polysaccharide resistant to the action of water or saliva and takes the stain avidly. Of course, large fragments can be seen by the unaided eye, but with this method very minute fragments will suffice for diagnosis, and it is useful where a liver hydatid has ruptured into the lung, or where the cyst has ruptured. Coloured figures illustrate very strikingly the things to look for. The changes which take place in the cyst wall after it breaks up are described in the following stages: (1) Change in the cement between the layer; (2) Disintegration of the lamina; (3) Similar or analogous changes in the cement between the lamellae and in the lamellae themselves; (4) Vacuolization and granulation of the layer; (5) Disintegration of them further and finally; (6) Phagocytosis of the fragments and granules. [There are even better pictures reproduced in a succeeding article by Professor ARDIO on Suppurating Hydatid of the Lung in the same issue of this Journal.]

H. Harold Scott

LANGLEY (G. F.) Primary Echinococcal Cyst of the Uterus—*Br. J. Surg.* 1943 Jan Vol 30 No 119 pp 278-280 With 1 fig.

LOPEZ NEYR (Carlos Rodríguez) Rallentamientos humanos en la zona tropical—*Med. de C. de la U. de Madrid* 1943 April 1 Vol 11 No 4 pp 215-242.

A general review of the subject.

YEATCOMB HAN (H. A.) & SHEHADI (William H.) Duodenal Ulcer Syndrome caused by Ankylostomiasis. Report of Twenty Five Cases with Gastric Acidity and Roentgenological Studies—*Amer. J. Roentgenology* 1943 Jan Vol 49 No 1 pp 39-48 With 2 figs. & 1 chart [25 refs.] [Summary taken from the Medical Letter prepared by the American Medical Association.]

It is well known that gastrointestinal disturbances caused by hookworm disease may appear in different clinical forms including that of duodenal ulcer. Symptoms are often vague and indefinite, the patients complaining of heartburn, flatulence, a feeling of fullness of the abdomen and irregular bowel movements. In this report from the American University Beirut Syria 25 patients whose clinical history was suggestive of chronic duodenal ulcer but in whom stool examinations revealed presence of ova of *Ankylostoma duodenale*

were studied with regard to gastric acidity and roentgenologic findings. Estimation of free gastric acidity showed a rise to a higher level in these patients than that obtained in duodenal ulcer. In spite of varying degrees of severe anemia such a high gastric acidity was maintained. Roentgenologic studies of these cases showed evidence of swelling of the duodenal mucosa, inconstant deformity of the duodenal bulb (duodenitis without ulcer niche), hyperperistalsis of stomach and duodenum and commonly reversed peristalsis of the duodenum without obstruction. Administration of a vermifuge successfully resulted in the elimination of epigastric pain within twenty four hours and the restoration of the duodenal wall in from eleven to twenty four days in these cases.

ANDREWS (Justin) Modern Views on the Treatment and Prevention of Hookworm Disease—*Ann Intern Med* 1942 Dec Vol 17 No 6 pp 891-901 With 2 figs [25 refs]

The author summarizes our present day knowledge of the control of hookworm disease because the more recent knowledge is not yet given in medical texts. After briefly referring to anthelmintics used before thymol became the standard remedy half a century ago, the author discusses the merits and drawbacks of oil of chenopodium and carbon tetrachloride. Carbon tetrachloride is undoubtedly the most effective and most conveniently administered hookworm anthelmintic now known. A single dose removes all the worms from 60-90 per cent of cases, but it is occasionally though rarely toxic. Severe poisoning or death occurs in an extremely small number of cases. The mechanism of its toxicity is discussed. The damage it does to the liver precludes its administration to alcoholics and if heavy roundworm infestations are present it stimulates the worms to abnormal activity so that the intestine may be blocked by solid plugs of worms and they may migrate forwards to the nose or pharynx or up the bile or pancreatic ducts. Mixtures of carbon tetrachloride and chenopodium are highly effective but both of these drugs have undesirable toxic properties.

Tetrachlorethylene is less effective than carbon tetrachloride but it is almost non toxic. The author's own work indicates that although one treatment with it will not remove the last hookworm from more than 50 per cent of patients it will remove about 90 per cent of all hookworms. Two treatments with it are equivalent to and much safer than one dose of carbon tetrachloride. Alcoholism and ascariasis are practically the only contra indications.

Hexylresorcinol is an ideal drug for pre hookworm treatment when *Ascaris* is present. If pills of it are swallowed and are not chewed there are no known contra indications and it can be given repeatedly to small children, aged persons and debilitated individuals. In doses of 1 gm it removes practically all roundworms [presumably the author means *Ascaris*] and about 70 per cent of hookworms although only a small percentage of patients are rendered hookworm free by a single dose. The author recommends tetrachlorethylene when hookworms only are present, when roundworms are also present he prefers hexylresorcinol followed by tetrachlorethylene or several rapidly successive doses of hexylresorcinol.

Recent American work on the control of hookworm disease is briefly discussed. A distinction is now drawn between hookworm

disease in patients in whom hookworms suck blood more rapidly than it can be replaced so that anaemia results and subclinical hookworm infestation in patients from whom blood is not removed more quickly than it can be replaced. In the opinion of the author preventive measures should detect prevent and control hookworm disease rather than subclinical infection [cf HILL and ANDREWS this *Bulletin* 1943 Vol 40 p 324]. Hookworm anaemia should be differentiated from anaemia due to other causes the family rather than the individual should be the unit of investigation sanitation and education of the people must be undertaken. The author refers to the work of FOSTER COFT and other American workers who have shown that dogs develop a highly protective immunity to the dog hookworm which can be broken down by dietary deficiencies. This immunity is separate from the haematopoietic potentialities of the dog. The time may come when control and cure of human hookworm disease will be possible by dietary manipulation. *G Lapeere*

HAWKING (Frank) The Distribution of Filarioid Infections in East Africa. Review—*Jl Trop Med & Hyg* 1942 Dec-1943 Jan. Vol 45 No 20 pp 159-165 [39 refs]

(1) A review is given of the literature relating to the distribution of filarioid infections in East Africa.

(2) *Wuchereria bancrofti* is common in the coastal regions of Kenya and of Tanganyika Territory in the region south of Lake Victoria in the Lwale and Tukuyu districts of Tanganyika in the West Nile province of Uganda and in the region north of Lake Kioga. It is rare or absent in the Arusha Moshi region in most of Kenya and along the eastern northern and western shores of Lake Victoria.

(3) *Acanthocheilonea ferslans* is very frequent in the regions to the north west and south west of Lake Victoria and in the Lwale region.

(4) *Loa loa* is virtually unknown in East Africa.

(5) *Onchocerca volucrii* occurs in the region north of Lake Victoria and both north and south of the Kavirondo Gulf. Small foci of infestation also occur around Tukuyu and Njombe.

(6) *Dracunculus medinensis* occurs only in the northern parts of Uganda.

SEMLADENI (B) Histologischer Befund bei einem Fall von zahlreichen Mikrofilarien beider Augen [Histological Appearances in a Case with Numerous Microfilariae in Both Eyes]—*Schweiz. Med. Woch.* 1943 Jan 16 Vol 73 No 3 pp 75-77 With 10 figs

The author describes the histology of the eyes of a Swiss geologist who was infested with *Onchocerca volvulus* at some time while he worked in the Sudan and Algeria. The condition was diagnosed with the slit lamp microscope which revealed about 300 living microfilariae especially located in the anterior layers of the corneal parenchyma. The eyes showed some reddening round the cornea which was slightly clouded by many inflammatory foci with slight pannus formation in places on the corneal margin. There was an eosinophilia of 25 per cent and some general symptoms e.g. skin eruptions swelling of the nose and ear diarrhoea night sweats headache disturbances of memory. The patient was given emetine and foudrin but he died later as a

result of a mountaineering accident. Sections of the corpse failed to reveal adult *Onchocerca* but sections of the eye confirmed the presence of microfilariae in it. They were present practically everywhere where there were lymphatics. They were found in the corneal parenchyma where there was inflammatory reaction but there was no cellular infiltration round the larvae. They were also found in the subconjunctival tissue in the iris in the outer scleral fibres and in the episcleral spaces in none of which situations were they to be found clinically. They were especially well seen in the ciliary body. The choroid vitreous humour retina lens and optic nerve had neither microfilariae nor inflammatory reactions. The slit lamp microscope made possible the diagnosis of this rare condition in the living patient. The paper is illustrated by good photomicrographs. *G. Lapage*

MAZZOTTI (Luis) & OSORIO (M. Teresa). Comparacion de las tecnicas de Hall y de Graham en el diagnostico de la oxyuriasis [Comparison of the Techniques of Hall and Graham for the Diagnosis of Oxyuriasis]—*Rev Inst Salubridad y Enfermedades Trop Mexico* 1942 Dec Vol 3 No 4 pp 323-328. With 2 figs. English summary (9 lines).

After a brief review of some of the literature on the incidence of human oxyuriasis in the United States, Canada, the Philippine Islands and Mexico, the authors describe the NIH swab introduced by HALL [this *Bulletin* 1937 Vol 34 p 878] and the swab devised by GRAHAM [both are illustrated in this *Bulletin* 1942 Vol 39 p 780]. Hall's swab consists of a 25 mm square of plain non-waterproof cellophane folded over and fixed on to a glass rod by a rubber ring; the perianal folds are stroked radially with it. It is then smoothed out on a slide in water or N/10 NaOH for microscopic examination. Graham's swab consists of a piece of Scotch cellulose tape half an inch broad and 8 cm long, which is folded over lengthwise till the two ends are apposed, the adhesive surface being outwards; the apposed ends are held in forceps so that the adhesive surface can be applied to the perianal skin; the eggs adhere to it and the tape can then be examined on a slide. Mazzotti and Osorio used however a piece of tape 5 cm long without doubling over the ends; apparently they held the tape lengthwise in forceps.

During five successive days they examined 17 children who had previously been shown to be heavily infested with *Enterobius*. The NIH swab was used first on each of these children and then the Graham swab, each child being therefore examined twice on five successive days. Of the 85 double examinations thus made, 82 (95.5 per cent) were positive with the Graham swab, while 78 (91.7 per cent) were positive with the NIH swab. On three occasions both swabs were negative.

Out of 240 children of a school in Mexico City examined in the same way, 109 (45 per cent) were positive with the Graham swab and 72 (30 per cent) were positive with the NIH swab.

In 65 per cent of the examinations the number of eggs found by the Graham swab was greater than the number found by the NIH swab. Thus the Graham swab appeared to be the better of the two, especially for the detection of light infestations. The authors point out that some of the negative results obtained with the Graham swab were due to the use of this swab after the NIH swab. The Graham swab

require rather more care than the NIH swab but the NIH swab is easier to use on adult males with abundant perianal hair.

[KALITUNEN EKBAUM (this *Bulletin* 1942 Vol 39 p 780) found the NIH swab more efficient and more convenient because the Graham swab may stick to the skin and its removal may cause some discomfort. The NIH swab was adopted as the standard means of diagnosis by the investigator in the United States whose 27 papers are summarized by CRAM below.] *C Lapele*

CRAM (Eloise B) *Studies on Oxyuriasis XXVIII. Summary and Conclusions—Amer Jl Dis Children* 1943 Jan Vol 65 No 1 pp 46-59 [Numerous ref.]

This paper summarizes the 27 papers published in various journals some of them not readily accessible written by American workers who have carried out the study of oxyuriasis started by HALL in 1936. The following are the main conclusions.

The exact life history of *Enterobius vermicularis* has never been worked out because it cannot be established in any experimental animal. Studies of infested boys showed that at 8 p.m. the females were still in the above the anal mucocutaneous junction at 9 p.m.

In the boy went to bed they were at this junction and by 9.30 p.m. on the skin as far forward as the scrotum or 2½ inches behind or to the sides of the anus. They preferred moist areas. Each female produces about 11,000 eggs. Embryonated eggs were found in dust from all rooms of infested households and infestation by inhalation of this dust is theoretically possible. The eggs survive best under moist cool conditions and cannot be killed by fumigation with HCN, paradichlorobenzene and naphthalene are also useless. Prevention of infestation is very difficult even strict hygienic rules may fail. For diagnosis faecal examination is inadequate. The NIH swab was used as the standard method of diagnosis but even with this it was hard to detect all cases. Repeated swabs are necessary as many as even being required for some members of families. The best time to take swabs is immediately after the patient gets up and before he goes to the toilet. Dermal tests were highly specific but intradermal tests with antigen dilutions up to and including 1:5,000 were not because they gave positives in infestations with other species of helminths.

Examination of the population of Washington D.C. showed that 41.5 per cent of the white adults and children examined were infested and 12.9 per cent of the negroes. Females were not appreciably more frequently infested than males. Incidence was highest in children of school age, lowest in adults. Children under 14 appeared to be more susceptible. Whites were more heavily infested than negroes. The infestations were often familial. If one case was found in a family, probably most or all of the children are infested and one or both parents may be. Infestations were not confined to older and congested areas nor to any social level.

A slight eosinophilia occurs but no anaemia. There was no evidence of association of gastro-intestinal symptoms, appendicitis, abdominal pain, craving for sweets, enuresis, nail biting, thumb-sucking, nose picking or grating of teeth with oxyuriasis. Tetrachlorethylene treatment improved appetite. In girls mucoid vaginal discharge was attributed to the entry of the worms into the vulva. A single vulval swab was positive in 14 out of 45 infested girls. Restlessness and

insomnia were common. Lack of co operation inattention feelings of shame and inferiority improved with treatment. Treatment was checked by seven consecutive swabs taken from the 10th to the 42nd day after treatment ended. A drug must be 100 per cent efficient or infestations will build up again. Oil of chenopodium and carbon tetrachloride were not efficient. Tetrachlorethylene was best for single dose treatment.

After a light supper and later a high soap enema the patient was given next morning without breakfast 0.1 cc of tetrachlorethylene in 30 cc of $MgSO_4$ plus 60 cc of water or in magnesium citrate. Tetrachlorethylene is more efficient in lightly infested cases. With hexylre-ornicol (1 in 2000 in water) 10 enemas spread over three weeks were the minimum necessary for eradication. Some patients needed more. The drug failed when it was given as a single dose in pill form. The efficiency of santonin was under 50 per cent. Gentian violet was found to be better than any other drug. For adults two tablets each of 32 mgm three times a day before meals and for children 10 mgm a day for each year of apparent not chronological age are given the total dose for each day being divided into three doses for children. It can be given for 10 consecutive days or for two periods of eight days with a rest of seven days between. Both water-soluble and enteric coated tablets were used and treatment was checked by seven consecutive daily swabs. Out of 224 persons treated 189 (84 per cent) were freed of the infestation. About 39 per cent had gastro intestinal upsets but these were temporary and quickly disappeared when the dose was reduced or given up for a day or two. The drug is contra indicated when there is concomitant infestation with *Ascaris lumbricoides* or cardiac renal hepatic or intestinal disease is present or alcohol has been taken recently.

G. Lapae

JOLLY (R. H. H.) Trichiniasis — *Med Officer* 1943 Jan 9 Vol 69 No 2 pp 13-14

This paper is reviewed in *Bulletin of Hygiene* 1943 Vol 18 p 383

HATIEGANU (J.) & FODOR (O.) Symptomenkomplex der chronischen Hypoglykämie bei der Trichinose [The Symptom Complex of Chronic Hypoglycaemia in Trichiniasis] — *Wien Klin Woch* 1942 Oct 9 Vol 55 No 41 pp 807-809

This paper is reviewed in *Bulletin of Hygiene* 1943 Vol 18 p 384

GOULD (S. E.) Immunologic Reactions in Subclinical Trichinosis — *Amer J Hyg* 1943 Jan Vol 37 No 1 pp 1-18 With 2 figs [31 refs]

This paper is reviewed in *Bulletin of Hygiene* 1943 Vol 18 p 471

DEFICIENCY DISEASES

BOEHRER (John J.) STANFORD (Charles E.) & RYAN (Elizabeth) Experimental Riboflavin Deficiency in Man — *Amer J Med Sci* 1943 Apr Vol 205 No 4 pp 544-549 [14 refs]

The authors quote SEBRELL and BUTLER — at the present time it seems that superficial vascular keratitis is the earliest and most

common visible manifestation of riboflavin deficiency as well as a rather reliable index of early deficiency of the B group of vitamins. To test this they subjected three volunteers to a diet low in riboflavin while to three control on a full diet extra riboflavin was given. The experiment lasted 35 days.

They expected to see corneal vascularization appear in accordance with the statement by SYDENSTRICKER, KELLY and WEAVER—

Under experimental conditions within a few days often only two empty capillaries can be seen arising from the apices of the loops outlining the scleral projections. In two or three days more they form complete loops through which red cells circulate irregularly and in clump.

Boehrer and his colleagues were however disappointed—nothing happened except in one of the control who developed a few streamers off nasal limbus left eye. A week later additional capillary extension from nasal limbus both eyes.

[The authors appear to realize some of the pitfalls associated with work of this kind. There are many variations which probably should be considered as coming within normal limits. This has been impressed upon the mind of the reviewer during some thousands of slit lamp micro copies.]

H. S. Stannius

YOLKINS (J. B.) PATTON (L. W.) ROBINSON (W. D.) & KEHN (Ruth)
An Analysis of Corneal Vascularization as found in a Survey of Nutrition—Reprinted from *Trans Assoc Amer Physicians* 1942
Vol 57 6 pp With 1 fig [Summary appears also in *Bulletin of Hygiene*]

The authors open by stating that Although there is little doubt that it [corneal vascularization] can be caused by a lack of riboflavin and that this vascularization can be distinguished from that due to certain other causes some doubt has arisen concerning its specificity and therefore its reliability as a sign of riboflavin deficiency. The authors analyze over 1200 subjects 30 per cent of whom were negro the entire population of a rural area in Tennessee on whom slit lamp examination were made. They divided their cases into two grades—positive and negative—and include in the former only those in which the invasion has taken place throughout the periphery of the lower nasal and temporal quadrants. In addition the vascularization must have clearly extended well into the anterior portion of the cornea.

Seventy three subjects were admitted into the positive group the vessel in most instances being filled with circulating blood. In only 15 per cent of the group were less than one third of the invading vessel filled with blood.

This positive group was compared with a control group of 121 subject who showed no vascularization. There was no essential difference in respect of age or sex but a striking difference in racial distribution—hardly any negroes were affected a finding which remains unexplained.

Between the positive and control groups no significant difference was found in relation to riboflavin intake, riboflavin:calorie ratio or other dietary factor nor was there any correlation with sociological features or various laboratory tests. The only significant difference was in the medical history and physical examination. In 29 per cent of the positives in contrast with 9 per cent of the controls infected sclera

common visible manifestation of riboflavin deficiency as well as a rather reliable index of early deficiency of the B group of vitamins. To test this they subjected three volunteers to a diet low in riboflavin while to three controls on a full diet extra riboflavin was given. The experiment lasted 35 days.

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[undefined] occurred asthenopia was more common but there was no difference in frequency of photophobia sore tongue or lip lesion in the positive group. None showed the frank signs of ariboflavinosis. The authors conclude. The results of this study indicate first that corneal vascularization as observed by us bears no clear relationship to the dietary intake of riboflavin nor to other evidence of riboflavin deficiency second that it occurs much more frequently in white subjects than in negroes third that there was a marked regression in the incidence and degree of vascularization in 15 subjects over a period of the winter months. The authors suggest that the dissociation of these ocular lesions from oral and other lesions may be due to a minor riboflavin deficiency being revealed in the cornea only owing to a second factor namely visible or U V light which destroys riboflavin locally.

H S Stannus

SHELLEY (Horace M) Pellagra — *East African Med J* 1943 Mar Vol 20 No 3 pp 68-82 [12 refs]

SPRUE

ADLERSBERG (David) & SOBOTKA (Harry) Influence of Lecithin Feeding on Fat and Vitamin A Absorption in Man — *Jl Nutrition* 1943 Mar 10 Vol 20 No 3 pp 255-263 [10 refs]

Present availability of commercial lecithin has rendered this study possible with a view to improving fat absorption in the treatment of sprue and coeliac disease.

As standard procedure the fat tolerance test of NISSEN modified by KANN & SOBOTKA was adopted. This test determines total serum lipids at intervals after ingestion of butter fat 1 gm per kilo after a twelve hour fast. The maximum rise of the total lipids in the blood occurs between the fourth and fifth hour after ingestion. The lipid content of the serum in the control group varied with fluctuations from 275 to 895 mgm per cent. In the gastro intestinal group (sprue jejuno ileitis intestinal tuberculosis) the average was slightly lower with a range of 160 to 550 mgm.

Fat tolerance tests were performed on controls and on persons with active sprue. The total lipid content of the serum in the controls showed an increase of 59 per cent four hours after ingestion. In the sprue group the content remained practically unchanged.

The third group consisting of three typical cases of sprue was examined after prolonged treatment with liver extracts and vitamins during remission and the total serum lipids increased 53 per cent after the fat tolerance meal thus indicating a more satisfactory fat absorption.

The addition of 10 to 15 gm of commercial lecithin spread on cakes was studied. The fat absorption was thereby increased in every control case the average being raised from 32 to 71 per cent. In three cases of sprue this addition resulted in moderate absorption averaging 27 per cent. After establishing the vitamin A and carotene content in the serum of controls and in cases of gastro intestinal disease the vitamin A tolerance test was instituted. This consists of the determination of the vitamin A content of the serum in the fasting individual and at frequent intervals after the ingestion of a test dose.

of vitamin A. Most tests were done with 3 cc. of percomorph oil (1 cc. equals 60 000 I U. of vitamin A). The maximum rise of vitamin A in the blood is found four hours after ingestion; it thus parallels fat absorption.

Again controls were employed—eighteen more patients convalescing from various internal diseases and twelve suffering from various gastro-intestinal manifestations. The lowering of vitamin A and carotene contents in gastro-intestinal and liver disease was striking and indicated vitamin A deficiency caused by diminished food intake and impaired intestinal absorption.

The vitamin A tolerance test was carried out in control cases and in sprue. In seven individuals who ingested 90 000 to 180 000 I U. of vitamin A the group average vitamin A content of the blood rose 41 per cent in four hours but the carotene content remained unchanged. In 10 cases of sprue however after ingestion of a similar amount of vitamin A no rise took place thus demonstrating the inability of patient with sprue to absorb fat soluble vitamins.

The effect of lecithin was also studied. Vitamin A tolerance tests were performed with and without the addition of 9 to 12 gm. of commercial lecithin. When lecithin was given the vitamin A content rose to 212 per cent; when lecithin was not given the content rose to 41 per cent only. There also occurred a moderate elevation of the carotene content of the blood when lecithin was given. Hence it is concluded that the addition of lecithin apparently promotes absorption of vitamin A in a manner similar to that of fat absorption.

Commercial lecithin represents the natural product of soya bean phosphatide with approximate content of 20 per cent lecithin plus 30 per cent soya oil. It was considered necessary to study the effect of lecithin on vitamin A and carotene contents of the blood without the addition of vitamin A. Four tests were made in which the vitamin A and carotene were examined in fasting specimens and four hours after the administration of 12 gm. of commercial lecithin. In three there was a moderate increase whilst in the fourth an actual decrease. The average percentual increase was 8 which may be due to mobilization of vitamin A in depots in the liver.

Philip Mason, B.Sc.

HAEMATOLOGY

DURAN JORDA (Frederic) **Formation of Red Blood Corpuscles —**
Lancet 1943 Apr 24 pp 513-514 With 5 figs

Observations are described which lead the author to believe that the red blood corpuscle is formed from the plasma cell by a process of secretion when the plasma cell disintegrates. In his view the red blood corpuscle is a simple droplet of colloidal nature in some respects similar to the fat globules in milk while the accepted lymphocyte is really a stage in the development of the normoblast. The platelets he considers are protoplasmic remnants of the original plasma cell which has broken up. All currently accepted theories concerning a glutination of red blood corpuscles are suggested should be revised on the basis of the laws of colloidal chemistry since the red blood corpuscle in the author's opinion obeys the general laws of colloidal suspensions.

Janet Laughan

OGDEN (M A) Sickle Cell Anemia in the White Race with Report of Cases in Two Families — *Arch Intern Med* 1943 Feb Vol 71 No 2 pp 164-182 With 8 figs [11 refs]

Four examples of the sickling trait in a family of Spanish descent and five in a family of German descent the first reports of the condition in persons of these nationalities are described and the hereditary transmission established. In the first family the mother had transmitted the sicklaemic trait to all her three children to one in an active form. In the second family all four children again one in an active form had inherited the mother's trait. At the same time the three sons inherited their father's blood group (A). In the German family a negro ancestry was proven and the author believes that in all white persons with the sickling trait an admixture of negro blood has occurred in the immediate or remote ancestry. Almost all the previously reported cases in white persons have been people of Mediterranean origin. Investigating the incidence of the condition in New Orleans the author found among 692 negroes 3 males and 2 females with active sickle cell anaemia and 3 males and 35 females with sicklaemia (immediate and delayed) the total incidence of the sickling trait being therefore 6.5 per cent. There was not a single case of the sickling trait found in 910 white persons examined. It was remarkable that of the 37 females showing the sickling trait only 2 (5.4 per cent) had an active sickle cell anaemia whereas of the 7 males the corresponding figure was 5 (71.4 per cent). Any sicklaemic person is a potential bearer of sickle cell anaemia and as few with the active condition survive beyond the third decade of life intermarriages between negroes and whites may directly endanger the white race. In order to determine the racial incidence of the condition the author recommends as part of every routine blood examination the observation of a moist preparation of whole blood if necessary for not less than 48 hours at room temperature.

F Murgatroyd

STASNEY (Joseph) Erythrophagocytosis and Hemosiderosis in the Liver and Spleen in Sickle Cell Disease — *Amer Jl Path* 1943 Mar Vol 19 No 2 pp 225-237 With 6 figs on 2 plates [20 refs]

Abnormal destruction of erythrocytes by the reticulo endothelial cells is characteristic of many haemolytic anaemias. Although gross morphological evidence of erythrophagocytosis is uncommon it is seen occasionally in pernicious anaemia haemolytic jaundice icterus gravis neonatorum Weil's disease and sickle cell disease. The spleen usually shows few phagocytosed erythrocytes these being mainly found in the Kupffer cells of the liver. Among 4 094 autopsies at the Charity Hospital Louisiana in three years there were 12 cases of sickle cell disease. In seven the spleens were normal in size or enlarged (average weight 286.4 gm) and the livers were normal or moderately enlarged (av. wt 170.5 gm) while in the remaining five cases the spleens were small (av. wt 19.7 gm) and the livers were normal or markedly enlarged (av. wt 210.6 gm). The normal ratio of hepatic to splenic weight is 9.3 to 1. In the first group of sickle cell disease it was normal or slightly raised but in the second it was very high. The livers were usually enlarged reddish brown and firm. Histologically there

was congestion the sinusoids were distended and filled with sickled cells the Kupffer cells were swollen and showed varying degrees of erythrophagocytosis. The liver cords were regular the parenchyma cell compressed slightly swollen and granular infrequently there as some lipoidosis. The spleens in the first group showed congestion of sinusoids and venous sinuses which were filled with sickled cells the lymph cells of the sinusoids were thin and irregular. The central arteries were dilated and the follicles were without germinal centres. Iron pigment was variable. The reticulum was a thickened fibrillar network with deposit of haemosiderin. Small haemorrhages and infarct were present. In the second group the spleens were fibrotic there was an increase in the hyaline connective tissue and widening of the trabeculae with deposits of pigment. The walls of the sinusoids which were filled with distorted erythrocytes were thickened and the endothelial cell were flattened erythrophagocytosis by the sinus endothelium was minimal. The follicles were inconspicuous and without germinal centres. Summing up varying degrees of erythrophagocytosis are found in sickle cell disease the Kupffer cells most frequently shown engulfed cell and the splenic reticulum only occasionally. No direct correlation was found between erythrophagocytosis and coexisting infection. *I. M. Atwood*

EPIDEMIC DROPSY

SARKAR (S. N.) A Sensitive Chemical Test for the Detection of Arsemone Oil. Part II. The Specificity of the Test—*Ann Biochem & Experim Med* Calcutta, 1942 Vol 2 No 2 pp 101-102

The author in 1941 described his ferric chloride test for Arsemone oil [see this *Bulletin* 1942 Vol 39 p 711] and compared it with the nitric acid test of Lal and his fellow workers [this *Bulletin* 1939 Vol 36 p 910]. In order to study the specificity of his ferric chloride test the author examined fourteen samples of vegetable oil many of which—for example linseed oil Mahua oil Niger seed oil Safflower seed oil sesame oil olive oil jute seed oil tamarind oil radish oil among others—are common adulterants of the mustard oil of commerce. Nine of them—the nine named in the foregoing—gave a positive to Lal test but all were negative to Sarkar's ferric chloride.

H. Harold Scott

VENOMS AND ANTIVENES

PETERSON (H.) & KOIVASTIK (Th.) Von der Toxizität des Kreuzottern (Vipera berus berus) Serums und seinen antivenösen Eigenschaften bezüglich homologer und heterologer Schlangengifte. The Toxicity of Viper (*V. berus berus*) Serum and the Antivenous Properties of the Serum against the Venoms of this and other Snakes.—*Ztschr. f. Immunitätsf. Exper. Therap.* 1941 Dec 10 Vol 10 No 5 pp 324-331

The blood or the serum of poisonous snakes is known to be toxic to experimental animals. Madame PHISALIX and CARL studied the era

of 30 snakes belonging to several different genera and found them to cause local and general reactions which might end fatally. The author has tested the sera from large numbers of vipers from Esthonia on rabbits guinea-pigs white mice and pigeons under four conditions (1) *Injected fresh* (the blood was collected and kept for one to two days at 2 C and the serum was then separated and kept at 2-4 C) Injected intravenously into rabbits 4 cc caused death in 24 hours 2 cc caused symptoms but were not fatal 1 cc killed pigeons in 12 hours 0.5 cc had no effect 4 cc subcutaneously killed guinea-pigs in 12 hours and 0.1 cc intravenously killed white mice in the same time. Clearly then the serum is toxic in small doses fatal in large doses (2) *After being kept in the refrigerator for a year* (at 2-4 C) The serum seemed no longer to possess toxic properties (3) *After heating at 56 C for 15 minutes* No toxicity (4) *After passage through a Seitz filter* The toxicity was practically equal to that of the fresh serum but the results would vary in a way not explained. Generally the results were the same as those in Exp 1 but whereas 0.25 cc caused no symptoms in mice 0.1 cc caused death in 24 hours.

The authors next proceeded to test whether the toxin of the serum was neutralized by viper antivenene prepared in horses. They injected white mice with a mixture of 0.1 cc of the antivenene and varying doses 0.4-0.1 cc of the fresh viper serum. The mixture was every bit as toxic as the fresh serum alone in other words the fresh serum contains toxins not neutralized by antivenene.

Their next study was to test the neutralizing power of the serum of *V. berus berus* against its own venom and using white mice as before they found that 1 cc of the serum would neutralize 0.39 mgm of the homologous venom but had no action against the venoms of other species *V. aspis* and *V. ammodytes*. [An interesting study.]

H. Harold Scott

MOLL (Aristides A.) Prevención y tratamiento del ofidismo [Prevention and Treatment of Snake Bite]—*Bol. Oficina Sanitaria Panamericana* 1942 Nov Vol 21 No 11 pp 1084-1088 English summary

In an article so brief as this the information given is necessarily very condensed at the same time it is very complete in the statement of the principles to be adopted. About 75 per cent of bites are on the legs and feet some 22 per cent on the hands and arms and only 3 per cent on the trunk hence it is well to travel in leggings and thick shoes and to wear long hip boots when it is necessary to wade through swamps. Also since snakes hide in crevices or along dead branches of trees it is always advisable when climbing rocks for example to test with a stick the places where one is about to place the hands.

The author goes on to enumerate the symptoms of snake-bite these need not be repeated here. He describes in detail the lines to be followed in treatment. At first a tourniquet which if risk of gangrene is to be avoided should be loosened for half a minute every 20 minutes or so. Next cross incisions of about a quarter of an inch and as deep as the penetration of the fang at each site bitten followed by aspiration by a rubber instrument like a breast pump for example. As the swelling increases similar incisions should be made at the periphery and more suction applied for 20 minutes each hour. Serum secretion is

aided by fomentations of magnesium sulphate or citrate with alternate application of perchloride of mercury 1:10 000 to keep the wound aseptic. Antivenene if available is best applied subcutaneously near the bite and around it at one hour intervals to form an area of defence to which the poison is tending to spread. Large quantities may be needed. The lethal dose of the venom of the North American viper is calculated to be 50 mgm for a man of 120 lb (8½ stone) and the Texan Crotalus may inject 10 times this and rarely as much as 1 000 mgm.

The author cautions against the giving of alcohol and against running because these increase the heart's action and promote absorption and dispersion of toxin. He is also averse to the local use of potassium permanganate on account of its injuring the tissues. He mentions Dr. HARRY ON and Dudley JACKSON of San Antonio as favouring the treatment by incision and suction and the wrapping in hot magnesium sulphate dressings to increase exudation. *H. Harold Scott*

SCHOTTLE (W H A) Die Grenzen der Serumtherapie bei Bissen afrikanisch r Giftschlangen [The Limits of Antivenene Treatment of Bites by Poisonous Snakes of Africa].—*Der Trop Ztschr* 1943 Feb 15 V L 47 No 4 pp 81-91 [30 refs]

The author tested the effects of antivenenes from six sources against the poisons of eleven species of snakes. The snakes were *Haemachatus la maha us* (2) *Dendroaspis iridis* *Atheris nuxia* *Meia sole ca* *B. lachesis* *B. gabonica* *B. nasicornis* *Aspis terasies* and 1 *aspera*. The antisera obtained were (1) Against West and Central African species of *Haemachatus* and *Bitis* (2) Against several African Colubridae and Viperidae [not specified] (3) Against Indian and Egyptian cobras. These three were from the Pasteur Institute in Paris. (4) A concentrated serum prepared from horses immunized by formal toxoid of *A. nuxia* and *B. lachesis* from the South Africa Institute for Medical Research Johannesburg. (5) Puff adder antiserum. (6) Cobra antivenene. Both these were from the Behringwerke, Marburg.

Vic were used as experimental animals. The toxin and antivenene er mixed and kept at 37 C. for half an hour before injection. {It is unlikely that in the field an antivenene could be obtained so soon.} The question of the limits of antivenene therapy, as posed in the title, is almost unanswerable because the amount of venom injected under natural conditions is very uncertain and the time which elapses between the injury and the use of the serum is very variable. These points are not considered sufficiently in the present article. The amounts of venom have been estimated as: *Dendroaspis* 100 mgm. *Haemachatus* 240 mgm. *Vaja m. ca* 250 mgm. *Vaja hae* 700 mgm. *Bitis lachesis* 250 mgm. *B. gabon* a 1000 mgm. or more. These are the figures given by GRASSET, ZOTENDYK and SCHAAFFSMA at the Royal Society of Tropical Medicine and Hygiene in 1935. H. Harold Scott

DERMATOLOGY AND FUNGOUS DISEASES

BLOMFIELD (D M) Prickly Heat—*Trans Roy Soc Trop Med & Hyg* 1943 Jan 30 Vol 36 No 4 pp 239-246

In this excellent paper the author makes the point that prickly heat and its sequelae may be far more than an irritating but rather trivial nuisance. He has found it in such severe forms as to affect materially the fighting strength of Army units. The severe forms were seen at Assab in Eritrea especially in the months of July and August.

He divides prickly heat into five types. (1) Miliaria the common form. (2) Multiple boils which are included because of a special form seen in association with the usual rash in which slowly developing painful blisters appear on the fingers beginning as deep seated whitish swellings. When the exudate is evacuated the skin peels away from a larger area than the original lesion leaving a red raw surface. No deep lesions were seen. (3) The impetiginous rash also a concomitant of the common rash and found at the alae of the nose or on the chin. (4) The pemphigous form in which symmetrical crops of blebs and bullae appear in the axillae and groins. These are very painful spread rapidly and are lavly filled with thin pus. This form may go on to (5) the pustular form with fungous infection when the bullae become angry looking pustules with black centres probably due to growth of a fungus.

Aetiology is discussed and it is noted that the diet of the men in this region was deficient in vitamins so much so that cases of avitaminosis were seen. The author does not believe that prickly heat is due to a fungus but attributes it to dysfunction through overaction of the sweat glands leading to blockage of the ducts followed by swelling with congestion and rupture of the capillaries of the glands. The finger blisters may be due to introduction of bacteria through minute abrasions. the facial condition is probably caused by a low grade coccial infection of a cut and is probably not connected with overaction of sweat glands. The blebs and bullae of the pemphigous type are probably due to breakdown of the special large coil sweat glands which are found only in the axillae and groins. The openings of the ducts of these glands are deep in the walls of the hair follicles. The author states that in the atmospheric conditions of Assab these glands also excrete part of their own living cells and that the intense activity they are compelled to undergo result in blockage and accumulation of dammed up fluid. Blockage of groups of glands may give rise to bullae as large as a thumb nail.

There are therefore two main forms of reaction of the skin to severe climatic conditions. (1) the miliar rash due to dysfunction of the small sweat glands and (2) the pemphigoid condition due to dysfunction of the large sweat gland. The other clinical conditions are due to invasion of bacteria or fungi. The author suggests the name climatic hyperidrosis to replace prickly heat or lichen tropicalis.

Treatment includes as much avoidance of sweating as may be possible bathing the wearing of as few clothes as possible the scrupulous cleanliness of all garments and the constant use of a towel to mop up sweat. The intake of fluid may be somewhat restricted since as a rule too much is taken for actual replacement needs. the diet should be adequate in fresh foods. A lotion of zinc oxide 30 gm

menthol 2 gm alcohol 160 gm and water 40 gm as used by the Italians was useful to allay irritation. For pemphigous lesions a simple powder was used and for the impetiginous condition an Italian ointment which probably contained chrysophanic or salicylic acid. The rate of improvement in patients remaining under the climatic conditions which brought on the affection is slow. In severe cases transfer to a cool climate must be considered.

[The author's views on the aetiology of prickly heat are sound they agree in essential with those of SIMONS who has studied the conditions in the Netherlands East Indies (see this *Bulletin* 1941 Vol 38 p 73.)]

C II

KESSLER (Ad) Behandlung und Vorbeugung des Lichen tropicu.
[Treatment and Prevention of Lichen tropicus (Prickly Heat)]—
Deut Trop Ztschr 1943 Feb 15 Vol 47 No 4 pp 92-94

There is no need to enlarge upon the inconvenience the curse of prickly heat to readers of this *Bulletin*. The number of vaunted cures is legion many contain solutions of salicylic acid in spirit or acetic acid preparations or talcum powder with salicylic acid or thymol or are in the form of medicated soaps. At times all seem to fail and some seem merely to irritate further a tender inflamed skin.

The basic principles should aim at relieving the itching and burning sensation drying up the vesicles neutralizing the skin secretion and at disinfection. The author has used the following for more than fifteen years—

Menthol	0.5 gm
Bismuth sub. alb.	50
Zinc oxid. pul.	900
Acid bor. p. l.	100
Talc. f. t. pul.	1000

The whole is to be in a very fine powder and passed through a small meshed hair sieve. After the patient has taken a quick warm bath the powder is to be dusted on the parts involved. Many take cold baths because they cool the inflamed skin but they are bad because the irritation is subsequently increased thereby. Those who are subject to the red dog (the German term for prickly heat) are advised to use the powder regularly. Without the menthol it is serviceable as a baby powder the menthol is omitted because the infant may convey it to its eyes.

The author gives also a formula for an ointment preparation which he strongly recommends if furuncles have been produced. This should not in his opinion be opened but the following ointment applied—

Hydrarg. praep. p. l. p. l.	10 gm
Balsam. peru.	5
Acid. bor. pul.	
Zinc oxid. p. l.	aa 10
Vasel. fla.	d 100

The precipitated mercury must be very finely powdered this may be done by rubbing a little of the ointment on the back of the hand.

when no gritty particles should be perceptible. The ointment is applied to the inflamed area and the part bandaged. The application is to be renewed in 24 hours. As a rule in three days the purulent foci have joined up and are easily removed by drawing on the superficial layers of the skin from the centre to the periphery. For the next two days after removal of the pus a thin layer of the ointment should be applied and covered with a light bandage to keep the surface clean.

H Harold Scott

ALPINS (O) *Pyoderma Ulcerosum Tropicum* — *Med Jl Australia*
1943 Jan 9 30th Year Vol 1 No 2 pp 30-31 With 1 fig

The condition described is common in the Northern Territory of Australia in the hot and damp season. The author has seen some 300 cases. An eruption starts usually at the site of an abrasion or a scratched insect bite on some exposed part but not on the face or neck. After a few hours vesicles appear discrete with surrounding inflammation. The vesicles break to discharge a straw coloured fluid and leave ulcers with thickened margins. This crusts over and the ulcer extends and deepens beneath it. The infecting organism appears to be a haemolytic streptococcus at times associated with *Staphylococcus aureus*. Prevention is best attained by wearing long trousers and long sleeved shirts. The best local treatment was found to be painting lightly with 50 per cent carbolic acid then cleansing with saline solution and applying Whitfield's ointment [benzoic acid 5 per cent and salicylic acid 3 per cent in white soft paraffin and coconut oil]. After the discharge ceases zinc cream with acriflavine (1 in 1000) is used daily till healing is complete. Sulphapyridine ointment was also found useful. [May we hope that it is not too late to protest against the title of this paper or rather against the name here given to the disease? There is no such Latin word as *tropicum* and Smith Minor would be caned and rightly for concocting it.]

H Harold Scott

BEERMAN (Herman) *Pinta—a Review of Recent Etiologic and Clinical Studies* — *Amer Jl Med Sci* 1943 Apr Vol 205 No 4 pp 611-623 [80 refs]

This review of recent advances in the study of *Mal del Pinta* is the outcome of a fourfold purpose. First because many good articles on the subject are not available to the medical public in general. Second because many United States soldiers are or may be stationed in districts where the disease is common and they may return infected. Third because of the recent determination of its aetiology and fourth because of its theoretical interest as another spirochaetal infection. The author treats of the geographical distribution the aetiology and transmission of pinta its epidemiology clinical manifestations serology and treatment. Most interesting is the relation to other spirochaetal diseases how that the Wassermann reaction is positive in 60 to 100 per cent of cases according to the stage that syphilis does not confer immunity to pinta nor does one attack protect against a second. [An altogether excellent account of the condition.]

H Harold Scott

TERREIRA (L. A.) Problemas de micología médica em Moçambique [Problems of Medical Mycology in Mozambique]—*Bol. Soc. Estud. Colon. Moçambique* 1941 Vol 10 No 44 pp 33-64 With 7 figs. [Summary taken from *Rev. Applied Mycology* 1943 Apr Vol 22 Pt 4 p 137]

This is a comprehensive account of the etiology, geographical distribution, mode of infection, pathological anatomy, clinical development, diagnosis and therapy of sporotrichosis associated in Mozambique with *Sporotrichum schenckii*. The paper includes keys to the family Sporotrichaceae and the genus *Sporotrichum* and an explanatory survey of the application of Beijerinck's auxanographic method of identification to the yeasts.

CASTRO PALOMINO (J.) & ALFONSO Y ARMENTEROS (Jose) Los micetomas. Revision de las investigaciones micológicas practicadas en Cuba [The Mycetomas. A Review of Mycological Investigations in Cuba]—*Rev. Med. Trop. y Parasit.* Habana 1941 Mar-Apr Vol 8 No 2 pp 0-27 With 2 figs.

ii FUENTES (Cesar) & JOSÉ ÁNGULO (Juan) Una nota aclaratoria en la polémica sobre la identidad de un actinomyces madurae identificado por el Dr. Pedro Domínguez y descrito por los doctores Oteiza, Ramírez Corra y Armas [Explanatory Note on the Identity of *Actinomyces madurae*]—*Ibid.* Sept-Oct Vol 8 No 5 pp 67-68 [10 ref.]

i The existence of mycetoma in Cuba has been known since the beginning of the present century. In 1901 ALBERTINI and DESVERNINE reported two cases of maduromycosis. In 1910 GOMEZ MURILLO recorded the first case of alveolar actinomycosis in an ox and stated that he had recognized it clinically four years before. In 1917 RODRIGUEZ reported a human case of actinomycosis but this state the authors was incompletely studied and they award priority to STINGER who reported a case of pulmonary actinomycosis in 1925.

The authors then give a general account of the mycetomas, mostly referring to the literature and adding cursory remarks regarding the appearance and cultivation and classification. They follow in the main the classification of CHALMERS and ARCHIBALD into the group Actinomycoses and Maduromycoses. They have tried repeatedly to cultivate the organism on various media but up to the present without success.

ii The writers of this note discuss in detail one of the cases to which the author of the preceding article has referred. They point out that there is no satisfactory classification of this group of fungi at present as different authorities use different criteria as bases for classification. They stress the need for standardizing methods of studying them so that results obtained by investigators may be compared and that in consequence a more orderly arrangement may develop out of the present chaos. [There is much in that the writers of this note affirm.]

H. Harold Scott

SIMSON (F. W.) HARRINGTON (C.) & BARRETSON (J.) Chromoblastomycosis—a Report of Six Cases—*Jl. Path. & Bact.* 1943 Apr Vol 55 No 2 pp 191-198 With 13 figs. on 3 plates

This paper gives details of six cases detected in the Union of South Africa. Four of the patients are natives, mostly of local tribes.

two were East Indians. All had lesions in the region of the ankles and all the lesions were of the verrucous type one being flatly papillomatous whilst all the others were frankly cauliflower like. In only one man was there a history of earlier injury at the site of the disease. The diagnosis was confirmed microscopically on each occasion but in only two cases were cultures made. In one of these the fungus had the characters of *Hormodendron pedrosoi* showing hyphae with pseudo acrothecal sporulation. The other culture still awaits classification but showed hyphae with lateral conidiophores. All the illustrations particularly those of the microscopic features presented by the fungi are excellent.

Sydney Thomson

MISCELLANEOUS

SMART (A G H) Some Medical Problems in the Colonies in Wartime
—*Trans Roy Soc Trop Med & Hyg* 1943 May Vol 36 No 6
pp 319-334 Discussion pp 334-338 [BLACKLOCK (D B)
RICHARDSON (D T) SMITH (Hugh) HACKFITT (C J)]

This address is a brief statement of the medical problems of the Colonies as they are affected by the war. The difficulties created have been great. Staff has been reduced for instance in Africa about one quarter of the medical officers have been released for military service and many of these were officers with specialist qualifications. There has been much traffic through the Colonies and much opportunity for the transmission of tropical diseases to the newcomers.

Yellow fever has been a preoccupation of the medical authorities of Africa and its control fortunately on the safe basis of preventive vaccination has needed organization on a wide scale. Endemic areas have been defined and the recommendations of the Interdepartmental Committee's Report on the public health problems of aerial travel have been largely adopted. In all matters concerning vaccination the great help of the Rockefeller Foundation, the Wellcome Research Institution and more recently the South African Institute for Medical Research is acknowledged.

Malaria in Africa is in the main the problem of *Anopheles gambiae* and its variety *melas*. So much has long been known but in the face of war time developments a Mission consisting of Professor D B BLACKLOCK and Dr Carmichael WILSON was appointed to examine the situation in Freetown. Further work is now being done on the essential study of the biology of these mosquitoes by Dr R C MURHEAD THOMSON who has done much to elucidate the habits of *A. minimus* in Assam. The danger of malaria to troops and to others whose movements are dictated by war time needs has led to the taking of measures of prevention which are of a temporary nature but these will eventually merge into the permanent control organization of peace.

Brief accounts were given of tuberculosis, typhus, venereal disease, cerebrospinal fever, tsutsugamushi and tsetse control and the problem of nutrition was discussed. As a result of war stimulus many colonies have become self supporting and the policy outlined in the STOCKDALE report should go far towards relieving the situation of general health in the West Indies.

The future medical policy of the Colonies will ensure that medical advances will not be limited by the revenue of each territory. The Development and Welfare Act will make available funds for expansion on a greater scale than ever before and this expansion will be based upon the statement of Medical Policy drafted by the Colonial Advisory Medical Committee and accepted in principle by the Secretary of State. In the discussion Professor D. B. BLACKLOCK emphasized the importance of sanitation of control of mosquito-borne diseases and of housing in relation to tropical hygiene. Major General D. T. RICHARDSON reported excellent results from the use of the belts designed by Professor P. A. BLAYTON for the control of lice. Dr. HUGH SMITH spoke of the work of the Rockefeller Foundation and pointed out that the Royal Society of Tropical Medicine and Hygiene is in a position to stimulate interest in tropical medicine. Wing-Commander C. J. HACKETT remarked on the assistance which had been given to the Royal Air Force by the Colonial Medical Service but drew attention to the disparity of practice with regard to malaria prevention in East and West Africa.

COLONIAL OFFICE Development and Welfare in the West Indies
194-194 Report by Sir Frank STODOLSKY KCMG CBE
Comptroller for Development and Welfare in the West Indies)
Colonial No 184-pp 11-93 1943 London HMSO
Is 6d. Summary appears also in *Bulletin of Hygiene*

This report should be in the hands of all persons interested in the welfare of the West Indies. Prominence is given to the section on public health in which the suggestion is made that the Health Unit system long known in Ceylon and Mauritius should be developed. Various suggestions are made for the control of the prevalent diseases and for the organization of medical services but it is clearly emphasized that good health is related not only to medical care but also to agriculture and industry, economics, social welfare and education.

ELSDON DEW (Ronald) A Pathologist's Abyssinian Notes—*South African Med J* 1942 Dec 12 Vol 16 No 23 pp 416-417

These are interesting notes they reveal the vast amount of medical work which is needed in Abyssinia. The author claims that there are three if not four forms of typhus epidemic disease-borne typhus is general in the colder areas and exacerbated by a tick-borne variety has been seen at Adama but the author doubts its identity with South African tick bite fever since there was apparently no cross immunity in one person who had experienced both diseases. There is a suggestion of a fourth form in cases of typhus like fevers in which P. OVALISTRON is agglutinated. The incidence of typhus in British and Imperial troops was infinitesimal compared with that in Ethiopians and Italians. Malaria is not found in Add Ababa and the mountain zone but P. vivax is found in what the author describes as the highland zone and P. falciparum in the lowlands. Other malaria parasites were not seen. Shiga and Flexner forms of dysentery occur and enteritis due to a bacterium of the Morgan type has been seen but

amoebiasis is apparently not a common disease Typhoid is common in the inhabitants

No case of yellow fever was seen but a case of leptospirosis was found in the west the Italians and Germans report completely negative results from surveys for yellow fever protective bodies Kala azar is found near Lake Rudolph

Venereal diseases are rampant including soft sore lymphogranuloma inguinale and granuloma venereum but gonorrhoea and syphilis are the most important yaws is widespread

Relapsing fever presents problems which require elucidation Except in Somaliland it is almost entirely louse borne and the author is convinced that there are several strains of the spirochaete One feature is the agglutination of *Proteus* VK in high titre (1 in 1 600) but all cases of relapsing fever do not show this Nevertheless the reaction was not found in control sera taken for the Kahn reaction or in sera from patients with malaria In positive cases there is progressive rise in titre and while the rise continues relapses may be expected On the other hand relapses may take place in patients who have no agglutinins The reaction was never positive in fatal cases patients who showed a positive result reacted to arsenicals

In general relapsing fever was very severe icterus was frequent and in certain outbreaks mortality was high even with arsenotherapy [The frequent occurrence of icterus may lead to confusion with yellow fever a difficulty realized by FINDLAY *et al* in the Sudan where an epidemic of yellow fever was accompanied by outbreaks of relapsing fever and infective hepatitis see this *Bulletin* 1942 Vol 39 p 457]

C IV

BLOSS (J F E) Notes on the Health of the Sudan prior to the Present Government—*Sudan Notes and Records* 1941 Vol 24 pp 131-143

This article is based on an address to the local Sudan branch of the British Medical Association 7 years ago It is a pity that the publication has been so long delayed for at the present time few will have the leisure to read an account full of information and interest and there is a fear even a likelihood that when the present stress is over it may have again been relegated to oblivion The author tells of the conditions in medical matters prior to the founding of the Kitchener School of Medicine and the establishment of a modern Medical Service The information has been gleaned—the author does not claim that the material for his notes is original—from the reports of travellers James Bruce (1765-1777) W G Browne (1793) but his book was not published until 1806) Burckhardt (1819) Baker (1866) and Schweinfurth (1871) Malaria dysentery smallpox venereal diseases and trachoma were rife leprosy guinea-worm enlarged spleen and liver (possibly from schistosomiasis) fairly common and what is called plague but which the author believes to have been typhus or cerebrospinal fever Baker reports that 15 000 died of plague at Khartoum in 1866 From the description it resembled typhus and was certainly not bubonic plague Measles also was very fatal and greatly feared More than 10 per cent of children are said to have died of it in some epidemics and blindness was a common sequela Inoculation for smallpox was practised there before it was in vogue in Britain Two methods were used One called *tishiterce* *et*

[August 1943]

in which a piece of rag was tied round the arm of an infected person and then transferred and tied on to the arm of the one to be inoculated. The other less extensively practised was called *dak el jed e* in this fluid from a pustule was rubbed into an incision made in the leg of the healthy person or into a scarified wound. The pus of a highly infected person was preferred to that of a person lightly afflicted as it was said that the disease caught from a heavily infected person had pent itself and therefore would not be so severe to the person attacked next. The mortality among those inoculated was only about two or three per cent which considering the total mortality was very small. [This experience is more fortunate than that reported by David Livingstone of a village where the inhabitants were inoculated from a patient with a malignant infection and nearly all died. The method of inoculation into a wound recalls that of the negroes of the Gambia who used to practise inoculation using a thorn or a knife or *da' er* point for inserting matter from a variolous pustule.]

In the days referred to by the author surgical treatment was crude and barbarous. Wounds after being washed were bound up after the application of butter ground coffee or gunpowder. Fractures were splinted with palm leaves but these were put on so tightly that in many cases gangrene supervened. When a limb had to be amputated for surgical reasons it was stretched through a hole in the wall of a house and severed with a blow of a sword. The stump was then plunged into hot oil to stop the bleeding. The rationale of treating infant diarrhoea by extraction of the teeth and cauterizing the sockets needs some explanation.

HILL (T Rowland)
pp 337-338

Tropical Neurasthenia — *Lancet* 1943 Mar 13

The author's thesis is that there is no real evidence that a tropical climate is a sole cause of neurasthenia but that the multiplicity of diseases and possibly malnourishment form the basis of much of the neurasthenia observed. The discomforts of tropical life no doubt tend to aggravate an existing neurotic tendency but they do not originate it.

Neurasthenia is a common cause of disability in hot countries and of 500 consecutive patients admitted to a tropical hospital the author reports that 50 were suffering from this condition [a list of 50 is given]. In 15 there was evidence of lifelong psychogenic states (10 of these had had recurrent malaria) in 9 hypochondriasis due largely to repeated attacks of malaria in 6 malarial cachexia in five conversion hysteria in three traumatic neuroses in three alcoholism in two anxiety neuroses in two head injury and in seven arteriosclerosis phthisis or duodenal ulcer. Constitutional neurotic tendencies and long-established neuroses were present in 22. recurrent subtertian malaria in 18. Ignorance of tropical disease and hygiene are important factors and those of poor general education should be given to laymen especially. Established neurasthenics and neurotics should be weeded out by careful psychological examination before they leave for the tropics as has been done by one large oil company.

C H

YOUNG (Charles T) COOL (Walter R) & KAWASAI (I A) Allergic Rhinitis and Asthma in Hawaii—*Har Medicine* Chicago 1943 Mar Vol 3 No 3 pp 282-290

This study was carried out in Oahu an island with a semi tropical climate with little variation in temperature and barometric pressure throughout the year and with a perennial type of native flora. In patients who develop the rhinitis the serous discharge is a severe symptom it is not seasonal but persists through the year.

The authors classify their asthma patients into exogenous and endogenous types the latter mostly giving no reaction to cutaneous tests and often showing no symptoms for several months after arriving in the island. Then they suffer from bronchitic attacks with in many cases residual asthma. Those of the exogenous type react to cutaneous tests often have an allergic rhinitis and the symptoms of asthma develop insidiously. They suffer more in the dry hot season whereas the endogenous suffer more in hot damp weather.

In the Hawaiian islands there are more than 200 grasses many grow all the year round but growth and pollination are greatest in the warmer months March-October. Ragweed is not common and there is no reason for suspecting it to be the cause of allergic rhinitis and exogenous asthma. On the other hand the *algeroba* tree the *alger* is important it is generally distributed grows readily and pollinates perennially especially from March to September. Local dust containing pollen of many grasses herbs shrubs and trees is of major importance in causing the rhinitis. Antigens for testing were prepared locally and a table gives the results of testing 220 patients with 24 antigens. Incidence rises in March and begins to fall in October when the cooler rainy season comes and cleanses the air of pollen. More patients were found to react to *algeroba* pollen than to any of the others. Many benefited from desensitization with local dust and a mixture of grasses and with *algeroba* pollen but numerical evaluation is not possible because some left time expired and others were evacuated to the mainland on account of the severity of their symptoms.

H Harold Scott

CLLNCI (William J) & KONDO (Yoshio) The Poison Cone Shell—*Amer J Trop Med* 1943 Jan Vol 23 No 1 pp 105-121 With 13 figs (6 on 1 plate)

This is an interesting paper and important at the present time when armed forces are operating in the Pacific. [The title of the article is not very well chosen for it is not the shell but the bite of the shellfish which is poisonous.] The shell is an attractive one and lures collectors to pick it up. The fish protrudes a stylet like proboscis and injects its poison. The author has done good service in reviewing the literature for recorded cases and has reported 17 in full dating from 1848 to 1939 and including one of which two notices have already appeared in this *Bulletin* [1936 Vol 33 pp 476 722]. The symptoms may be severe and indeed fatal—acute local pain swelling numbness perhaps spreading paralysis and later gangrene thick speech dimness of vision drowsiness which may end in coma and death.

A graphic account is given of an encounter between a *Conus textile* and a small octopus ending in the death of the latter. A series of line drawings demonstrate well the anatomy of the shellfish and a plate shows the beautiful markings of the shells of six species of *Conus*.

H Harold Scott

ALA HEDA COUNTY Mosquito ABATEMENT DISTRICT ANNUAL REPORT
1943 39th Congress 1st Sess. 1943 Feb Calif: Co rt H u O Wnd

DE MEILLON (Bothe) E t sa nti malis d Lu so Ma l
N I I C t p da (Dipt \ mit x ra) In C l na
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BRODY (Arthur L.) & I NPLING (Edward F) Can Larvae of C cll r-
m i a icana C and P mature in Carcasses - J I was tol
1943 Feb Vol 29 No 1 pp 59-60

The true crew arm Cochli nra lo i to at (a it sca it)
normally an obbit r parasite causin nyasi in an mal and man
In nature the untreat animal becomes subject to multiple infestations
and finally dies It is of some importance to know whether the
maggot can ontine their development in the carcass to produce
flies Experiment b the authors h m that if the carcass is protected
from other flies development can proceed ju t as in the living tissues
But under a rmal conditions the carcass i aj dly invaded by many
arnon feedin maggot which c mpte n th the screw worms o
succes fully that almost none of these reach maturity

SABIN (Albert P.) & RICHMAN (Isaac) Characteristics of th
Toxoplasma Neutralizing Antibody - P a \ Exp rim B l o
J d 1947 Oct Vol 31 No 1 pp 1-6 With 2 charts

In previous papers SABIN and OLITSKY and SABIN have shown that
rhesus monkeys infected with toxoplasma develop antibodies in the
blood as demon trated by reduction in ze of the skin lesion in rabbits
produced by the intracutaneous inoculation of emul on of mouse
brain when to this emul ion is add d serum in d l ut on of 1 in 10 to 1 in
100 In carrin out these te t it was noted that certain sera f on
recovered monkeys dappe red f m the blood soon after
concluded that antibodies dappe red f m the blood soon after
recovery It h n been found that f perfectly fresh sera are
employed for the te t antibodies can be demonstrated several months
after recovery I t h n been found that f perfectly fresh sera are
per i fence of antibodies I as not led to infection hom n that the
found that the antibodies are destroyed by half an hour exposure to a
temperature of 56 C and that the previous roneous conclusions were
due to the fact that a similar destruction occurred but more slowly
at the i e box temperature of 5 C at which the sera were sto ed
It was proved that the destruction due merely to disappearance of
and was not an apparent destruction due merely to disappearance of
complement In order to preserve the antibodies it was necessary to
store the sera at the lo s temperatures provided by CO snow r to dry
them in the frozen state Tests carried out with the serum
in the era for at least 14 months Under these conditions antibodies per i ted
from a case of toxoplasmosis in an ei l teen month old infant sho ved
that it had similar properties to those of the sera of infected monkeys
It was not possible to demon trate neutraliz ng antibodies in the sera of
infected rabbits mice cats and dogs

C V J J

SABIN (Albert B) *Toxoplasma* Neutralizing Antibody in Human Beings and Morbid Conditions associated with it—*Proc Soc Experim Biol & Med* 1942 Oct Vol 51 No 1 pp 6-10

By means of the rabbit skin test described in the preceding paper a survey of the sera from 151 selected individuals was carried out. The skin test was standardized so that comparable results were obtained. Two brains of mice which had died four days after intracerebral inoculation of *Toxoplasma* material were ground in a mortar and Tyrode's solution added to make a 10 per cent suspension of the brain substance. The suspension was allowed to stand for half an hour in an ordinary refrigerator. The opalescent supernatant fluid was then separated and was considered to represent a 1 in 10 dilution. From it by addition of Tyrode's solution other dilutions were made. For skin inoculation 0.15 cc. of one or other of the dilutions was mixed with 0.15 cc. of serum to be tested or with the same volume of Tyrode's solution for the control. The *Toxoplasma* skin lesion is fully developed by the 7th or 8th day after which it begins to blanch. The rabbits generally die of a generalized infection on the 9th to the 12th day. In the case of positive sera the 1 in 20 and 1 in 100 dilutions of *Toxoplasma* material produced distinct lesions while in the case of strongly positive sera the 1 in 100 dilution failed to produce any lesion. With the controls the 1 in 1000 dilution always and the 1 in 10000 dilution frequently gave rise to lesions. With this procedure 59 of the 151 selected cases were positive. A high incidence of positive tests was found in children and infants presenting psychomotor disturbances with or without hydrocephalus or microcephaly only when these were associated with cerebral calcification or choroido retinitis in the macular region or both. The congenital character of the disease was confirmed by the regular presence of antibodies in the mothers of the affected children. Cases of choroido retinitis of the macular region in otherwise normal children and adults were associated with antibodies 9 times out of 10.

C M Wenyon

WARREN (Joel) & SABIN (Albert B) The Complement Fixation Reaction in *Toxoplasma* Infection—*Proc Soc Experim Biol & Med* 1942 Oct Vol 51 No 1 pp 11-14

With the tissues of infected rabbits and mice attempts were made to prepare antigens which would fix complement with the object of rapidly diagnosing *Toxoplasma* infections. The only success was obtained with an antigen made by freezing and thawing a suspension of heavily infected rabbit brain. With this antigen it was possible to demonstrate the presence of complement fixing antibodies in the blood of experimentally infected monkeys 1 to 4 weeks after inoculation but unlike the neutralizing antibodies the presence of which can be proved by the rabbit skin test they disappeared sometimes as early as two months. A certain number of human beings who were known or suspected to have *Toxoplasma* infection also gave positive complement fixation reactions. However 20 individuals whose sera had been shown to contain neutralizing antibodies gave negative reactions but in none of these cases was the *Toxoplasma* infection of recent date. Though it is admitted that a positive complement fixation reaction does not in all cases indicate active or even recent infection it is

believed that the test described may have great usefulness in the rapid diagnosis of active toxoplasmosis. *C M Henyon*

WARREN (Joe) & SABIN (Albert B) Effect of certain Antiprotozoal Drugs on *Toxoplasma* *in vitro* and *in vivo*—*Proc Soc Experim Biol & Med* 1942 Oct Vol 51 No 1 pp 15-18

SABIN (Albert B) & WARREN (Joe) Therapeutic Effectiveness of certain Sulfonamides on Infection by an Intracellular Protozoan (*Toxoplasma*)—*Ibid* pp 19-23

In the first of these papers are recorded experiments on the action of certain therapeutic agents on toxoplasma infections in mice and rabbits. As a preliminary the effect of the drugs on the parasites outside the body was studied by adding the drugs in varying concentrations to toxoplasma-containing peritoneal exudate from infected mice. After the drug had acted for some time at 37 C the viability of the parasites was tested by inoculation of mice. In this type of *in vitro* test it was found that atebirin in a concentration of 1:50,000 rendered the toxoplasma non-infective in less than three hours. Trypaflavin, nivanol, lactate, potassium antimony tartrate, optochin, maplarsen, neosalvarsan, tryparsamide and quinine hydrochloride in higher concentrations gave the same result in more than three hours. Atebrin was thus the most effective agent. On the other hand stibosan, 4,4-diamidino stilbene, sulphamylamide, sodium sulphathiazole and sulphapyridine were without any effect even after 74 hours exposure. When all these drugs were administered parenterally to mice and rabbits immediately after injection of the toxoplasma and once or twice daily after they had no therapeutic effect whatever.

In the second paper an account is given of a further series of tests in which the blood concentration of the drugs was maintained by administering them in 1 per cent concentrations in the food. In this way it was shown that sulphathiazole and sulphapyridine although ineffective *in vitro* when given to mice injected with 100 mld or less for 18 days cured them although they failed to cure mice injected with 1,000 or 10,000 mld. The mice dying of their infections at varying intervals after administration of the drugs had ceased. Sulphamylamide did not have a similar effect. Owing to the irregular feeding habits of rabbits sulphathiazole failed to cure them of toxoplasma infections but when large doses were given parenterally at regular intervals day and night a distinct curative effect was obtained. Atebrin and quinine hydrochloride were without effect on the infection when administered in the food. *C M Henyon*

FISCHBACH (Hans Werner) Ueber die hygienische Gestaltung moderner Tropenwohnhäuser einschliesslich Klimatisierung [On the Modern Hygienic Construction of Tropical Dwelling Houses including Air-Conditioning]—*Dent Tr p Ztsch* 1942 No 15 & Dec 1 Vol 46 Nos 22 & 23 pp 553-564, 575-586 [67 ref.]

Earlier work on the physiological effects of the environment on the human body is reviewed. The influence of temperature and humidity on bodily heat loss is discussed together with the effects on skin temperature of sensible and insensible perspiration. The preservation

of normal body temperature is necessary for continued comfort if this temperature rises unduly it is likely to cause an increase in the pulse and respiration rates Vomiting and fainting may ensue leading in extreme cases to heat stroke heat cramps hallucination and general equilibrium disturbance It has been found that even in resting subjects at an air temperature of 33 C and a relative humidity of 90 per cent the body temperature rises 0.3 C and that there is some acceleration in pulse rate

Sweating also can impose a strain on the human body In many people it induces exhaustion in some degree and this if continued may cause a general listlessness together with insomnia These phenomena are not uncommon even in Central Europe during hot weather The salt loss from the body is probably one of the factors contributing to the harmful effects due to sweating

The European who is acclimatized to the more temperate zones of the continent is affected by the climatic changes when transferred to the tropics and the general lowering of body tone also reduces his power of resistance to illnesses and fevers The author suggests that much could be done to ameliorate general living conditions by paying greater attention to the construction of dwelling houses in the tropics Various existing types of structure are described and the relative merits of brick stone and wood as insulators against heat are discussed The usual European house is not serviceable in the tropics it gives little protection from the heat due to intense solar radiation and affords much harbourage for insects and vermin The bungalow type of structure is recommended particularly if it has low shaded verandahs The outside walls and the roof should be of sufficiently solid construction to keep out radiant heat effects in this respect the use of suitable insulating materials is also stressed Floors and inside walls should be as smooth and level as possible thereby reducing haunts for insects etc to a minimum Particular attention should be paid to the arrangement of doors and windows in the rooms so that fuller benefit may be obtained from increased air movement Fans are helpful in moving the air but although general building costs are usually not excessive the provision of electric current in many places is still something in the nature of a luxury In spite of this however the author goes on to recommend the use of apparatus which will further condition the air in tropical dwelling houses as he feels that such benefit is long over due Small electrically operated air conditioning units are now available which can cool and dehumidify the air A relative humidity of the order of 55 per cent is quoted as a desirable figure to attain The units are capable of producing a comfortable micro climate in a room of average size (say $4 \times 4 \times 3$ m) and being portable they can readily be taken from room to room as desired

The assessment of an environment from the subjective point of view is described and the American Effective Temperature scale is suggested as a useful index Although air conditioning will be beneficial in the tropics the danger from cold shock on entering a cooled environment from a warm outside condition must not be overlooked German engineers have stated that for an outside temperature of 35 C a room temperature of 27 C with a relative humidity of 60 per cent can be tolerated on entering but the author feels that for Europeans this temperature drop of 8 C may be somewhat excessive

C G Warner

SCHARFF (J W) The Use of Sullage-Water Precipitate in making Compost - *Jl Roy San Inst* 1943 Apr Vol 63 No 2 pp 92-94 [Summary appears also in *Bulletin of Hy 12 12*]

It is a curious fact that in all the thought so properly given to the disposal of waste matters of various kinds in Britain attention has in the past been directed mainly to their destruction or dissipation rather than to their utilization for useful and beneficial purposes. The development of the Indore Process of Composting has gone far toward correcting this and with the added inspiration of necessity in wartime attention is now focussed upon the means by which almost any kind of mixed animal and vegetable refuse can be manipulated so as to destroy by continued fermentation pathogenic and other noxious matter. This biological process of controlled and orderly decay brings about the rapid conversion of complex organic substances into humus, a valuable plant food and the essential ingredient of fertile soil. Ordinary sludge from a sewage purification plant or the precipitate resulting from the clarification of sullage water by the use of ferrous sulphate and lime as now practiced is here necessary in army camp can be utilized with ordinary vegetable wastes to assist the fermenting process and the production of humus.

In this article the author outlines a method of composting with sullage precipitate carried out at the Army School of Hygiene. The method dealt with is designed for use in places where suitable waste matters available for composting are limited to comparatively small quantities.

The necessary equipment consists of a couple of boxes set side by side each four feet square and four feet deep. The roughest type of boarding is suitable and joints between the boards should be about one inch in width to allow of free circulation of air through the contents when full. One side of each box is made removable so that the material can be readily turned out in the process of compost making. The boxes are fixed over a channel filled with coarse rubble for drainage also to provide ventilation.

Materials composted consist of weed, grass, bracken and some animal wastes—in this case bedding from rabbit hutches. The mass must be kept moist—water may be used if required. Urine is valuable for this purpose but sludge or sullage precipitate are equally suitable. The materials are filled into the boxes in layers and a sprinkling of sifted top soil or of mature humus is included at each foot of depth.

The boxes are used in rotation, a fortnight being allowed in which to fill each box.

At no time in the filling should the material be compressed. It sinks considerably of its own accord during the filling and subsequent fermenting process. As an aid to ventilation a stake is driven through the centre of the mass to the bottom, this is rotated to form a vent and it can be used to observe variations in temperature.

At the end of the first month both boxes are full, by this time also the material in the first box will have rotted sufficiently to be ready for turning out. Then one box is emptied and is ready for refilling on each succeeding fortnight.

When turned out the material is tacked in the open air. The effect of this follows the preliminary period of maturation is to bring about conditions favorable to further fermentation. At the end of two or three weeks these are complete and the humus is ready for use.

The amount of humus formed within each box weighs approximately half a ton thus within two months of starting by continual working the amount produced may be at the rate of one ton a month sufficient to meet the needs of one or two acres of land indefinitely.

The measurements given for the boxes are the smallest which can be expected to function effectively. To conserve heat in cold weather the boxes may be insulated on the outside with any available material e.g. bracken straw hay etc.

The utilization of organic wastes by a method of this kind is a most valuable aid in the maintenance of soil fertility at the present time a matter of exceptional importance.

Henry H. Clay

BOOK REVIEWS

CLAYTON (C) \ IRLZ GALLARDO (F) Tifus exantemático
Etiología—Clínica—Profilaxis [Etiológico Typhus, Prologo
del Prof Dr J A IRLANCA—166 pp With 41 figs on 16 plates
[Bibliography] 1941 Madrid Gráficas Afrodiseo Aguado
S A Barquillo 4

This is an excellent book. It gives a clear concise and up to date account of every aspect of louse borne typhus fever. The authors have had exceptional opportunities for observing the disease in the recent epidemics in Spain and they have also embodied the results of a close study of the literature of the subject. The other fevers of the typhus group are briefly described and their relationship to louse borne typhus is discussed in the light of modern research.

There are few grounds for criticism but exception must be taken to the classification of the Rickettsiae quoted by the authors and referred to by them as being the most acceptable up to the present time. In this the virus of dengue is included as an unnamed Rickettsia while the virus of tick borne typhus is excluded and is described as belonging to a different genus altogether. But in the other parts of the book this bewildering classification is not followed. No further reference is made to dengue as a Rickettsial disease and due emphasis is laid on the close relationship between tick borne typhus and the other fevers of typhus group. The difficult problem of murine Rickettsiae is dealt with in a broad minded and impartial manner.

There are 41 excellent illustrations. A useful bibliography is also given of the recent literature from 1939 to the early part of 1941. It is a pity that there is no corresponding book in the English language but the literary style is so clear and simple that any one who can read French or Italian will have little difficulty in following the text. The book will appeal to laboratory workers as much as to clinicians and epidemiologists.

John W. D. Megaw

GREGG (A. L.) [MA MD MCh BAO (Dublin) DTM & H
(Lond) LM (Rotunda Hospital) etc] Tropical Nursing A
Handbook for Nurses and others going abroad With a Foreword
by the Hon Sir Arthur Stanley GBE CB MVO 2nd
Edition—pp vi+180 With 13 figs 1943 London Toronto
Melbourne & Sydney Cassell & Company Ltd [6s]

The field of nursing like the field of medicine has become very much widened in recent years. Nursing in the tropics now includes in its

cope not only the care of the sick from the clinical point of view but also many other nursing matters of an administrative preventive and social nature.

Thus the nurse in the tropics as at home may be concerned with the patient as a sick individual suffering from a disease in which certain signs and symptoms physical and psychological have to be noted and for which the appropriate nursing treatment must be provided. She may also be concerned with the patient as a victim of certain environmental conditions which gave rise to the sickness and for which the appropriate advice and treatment are required.

Yet again the nurse in the tropics may be concerned with the provision of a suitable hospital environment arranging and adapting such things as hospital equipment ward routine diet and general living conditions as far as possible in a manner suited to the climate to the materials available and to the customs of her patients. She will most likely be concerned not only with the nursing of Europeans but also with the care of the local inhabitant. In this work she will be assisted increasingly by a native staff for part of the training of which she will be responsible.

A complete text book on tropical nursing therefore would have to cover a very wide field to be of universal use.

The author of this text book concerns himself with the subject mainly from a clinical point of view. Section I (five pages) deals with personal hygiene in the tropics giving a brief and useful account of what a nurse should do in order to keep herself healthy in a tropical environment.

Section II the main part of the book (140 pages) deals in alphabetical order with the chief so-called tropical diseases. These are explained very clearly and concisely their causes clinical course medical and nursing treatment and prophylaxis being described.

Section III (18 pages) is concerned with certain forms of technique which are associated with these diseases. The methods of making thin and thick blood films are included a useful and necessary technique for all nurses in the tropics where the results of blood examination depend so greatly on proper film making.

Section IV (four pages) deals with the important subject of the care of the eyes in the tropics in an admirably succinct and practical manner.

The book is compact printed clearly on excellent paper and though of limited scope should prove a useful guide and book of reference in tropical diseases for those engaged in the field of clinical nursing in warm climates.

Mary Blacklock

TROPICAL DISEASES
BULLETIN

Vol 40]

1943

[No 9

SUMMARY OF RECENT ABSTRACTS *

VII HELMINTHIASIS

(Continued from p 578]

Ankylostomiasis *Infections with Trichostrongylus Strongyloides*
and *Ascaris*

As a result of the study of an experimental infection with 50 infective larvae of *Necator americanus* PALMER (p 98) concludes that hookworm eggs are so unequally distributed in formed stools that the egg count from a random sample does not give a reliable estimate of total egg content. The count of a sample of a homogeneous water suspension of the whole stool is however reliable. Egg counts should preferably be expressed as the number per cc of stool rather than as the number passed *per diem* because the daily egg output varies more than the egg content per cc.

SAWITZ (p 771) has tested the buoyancy of certain nematode eggs by means of solutions of different strengths of zinc sulphate. *Enterobius vermicularis* eggs float in a solution of specific gravity 1.115 and at sp gr 1.180 70 per cent are present on the first cover slip used in a DCF process. *Trichuris trichiura* eggs float at 1.150 and 52 per cent of eggs are present on the first cover slip at 1.180. *Ancylostoma caninum* eggs float at 1.055 and 87 per cent are present on the first cover slip at 1.150. LANE had previously noted that a specific gravity of 1.150 is necessary for floating human hookworm eggs. EGAN (p 463) describes a simple floatation technique for demonstration of hookworm eggs in faeces: a saturated salt solution is used without centrifugation. BROCK and CALO (p 473) refer to the cardio-vascular effects of hookworm infection which are held to be caused by the anaemia and by toxins from the worms. BROWN and OTTO (p 99) note that eosinophilia is associated with acute or recent infection with hookworms but disappears or is decreased in cases of long standing debilitating hookworm disease. AGUIAR (p 707) considers that there is some clinical evidence to support the view that hookworm infection may lead to fatty nephrosis.

The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin* 1940 Vol 39. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

[September 1943]

DE SARASIM and GUNAWARDENE (p 50) report a death rate of about 2 per million in person treated in Ceylon with anthelmintics for hookworm infection. Most of these fatalities were in children. ALLISON (p 631) gives the following outline for the treatment of acute carbon tetrachloride from the intestinal tract: the forcing of fluids by the mouth and intra-venous blood or plasma transfusion constant study of the blood and complete rest in bed. The importance of early intravenous transfusion of calcium and dextrose is mentioned. PIERRE (p 69) describes from the Belgian Congo a syndrome associated with hookworm infection and the consequent deficiency in iron and iron changes in food. The colour of the skin may change from a yellow tint and the hair may become the colour of straw. Normal pigmentation returns as cure is established. There are in addition the common signs and symptoms of hookworm anaemia. This condition known as diboko is most common between September and December when the diet of the people consists chiefly of bread made from maize. The muntic treatment combined with administration of iron gives remarkable results. See also ALLEGRA.

HEIL (p 58) states that in Malaya cases of general anasarca are common and that the usual cause is hookworm infection which must be differentiated from heart failure and nephritis. Cardiac signs are usually minimal. In treatment it is necessary to improve the blood circulation without risk. This is effected by administration of Bland's pill, but a minority of the patient require crude liver extract. A diuretic is given and this treatment usually continued for three weeks. It is at this time the haemoglobin has been raised to 35-40 per cent. Anthelmintic treatment can then be given with safety and generally brings away immunable results.

WINTER (p 100) considers that unless the diet is deficient in iron even a heavy load of hookworms does not produce anaemia. Rice especially when polished is poor in iron and rice eaters cannot meet the demands of blood loss or pregnancy. The author concludes from their investigation that anthelmintic treatment alone is of little immediate value as regards anaemia in these people but that anaemic patient a return of haemoglobin to normal may be achieved with iron alone but cannot be maintained unless the worms are removed. It is not justifiable to treat a patient with a very low haemoglobin level by anthelmintic before iron has been administered. Two courses of ferrous sulphate or ferrous ammonium sulphate are given in severe cases 15-44 grains each course lasting three weeks. The anaemia of hookworm infection is due mainly to blood loss but there may be a loss of absorption as a result of intestinal mucosal dysfunction. Similar to the Southern United States the primary object in hookworm control should be to detect and prevent the disease rather than the burden of infection. Where iron and protein symptoms are adequate infection will generally not lead to clinical symptoms. Where chronic anaemia will occur whether hookworm infection is present or not. Hookworm disease is more likely and more severe where worm burdens are high.

and iron and protein consumption low. The intensity of infection and the diet of the people must therefore be studied. In treatment he advocates a preliminary course of iron in severe cases and a course of iron after administration of anthelmintic in moderate cases. In communities in which sanitary reform is difficult he advises two courses of treatment during the cold months when the soil does not contain larvae. Tetrachlorethylene is the drug used.

TUCKER and CHISOLM (p 858) report a great decrease in the incidence of infection with *Necator americanus* in Tennessee since the 1913 survey made by the Rockefeller Sanitary Commission. This reduction is related to improvement in education, sanitation and economic conditions and the present incidence of disease is much higher among people who do not possess approved sanitary facilities than among those who do. A considerable reduction of the incidence of *Ascaris lumbricoides* infection has also taken place. SAPERO (p 472) shows that in recruits for the United States Navy drawn from the southern States between 1918 and 1925 the discovered incidence of infection with *Necator americanus* was 23 per cent. After the hookworm campaign in the south the incidence fell to 0.72 in 1932 but recently examination by simple smear gave positive results in 11.3 per cent and by the Willis floatation method in 21 per cent. Infection was less frequent in coloured men than in white. The average percentage of haemoglobin in the infected was 76 and in the non infected 83. These findings in a selected group indicate a serious situation in the southern States.

PESSOA *et al* (p 473) have investigated hookworm infection in Sao Paulo. They used the Stoll Hausheer method for egg counts comparing it with simple smear and with the number of worms recovered after treatment. They note that this method does not detect light infections. In treatment tetrachlorethylene was found to be fairly effective in doses of 3-4 cc for adults the only toxic symptoms being those of dizziness or drunkenness. When *Ascaris* eggs were present oil of chenopodium was combined with a reduced dose of tetrachlorethylene. The results indicate that the drugs are more efficient if used in conjunction with a saline purge than if given in castor oil. A single treatment with tetrachlorethylene reduced the number of *Necator* eggs by about 50 per cent but two treatments with tetrachlorethylene or one treatment with carbon tetrachloride reduced the number by about 80 per cent.

In a town near Sao Paulo the incidence of *N. americanus* infection was high especially in girls and heavy infection with *Ascaris*, *Trichuris* and other parasites was found. Hookworm larvae were found in the soil round only one of six schools examined and in soil round only one of six home privies. Eggs of *Ascaris*, *Trichuris* and *Enterobius* were much more common and these eggs were also found in dust swept from houses. It was noticed that when privies were situated inside the houses the families were not so heavily infected with hookworms as when privies were in the open. The infection rate in children living in homes in which latrines were present was lower (though still high) than the rate in children whose homes did not possess latrines. Summing up this work the authors conclude that a new hookworm campaign is necessary and that this should be conducted rather by the school teachers than by members of the sanitary staff. The school should be a centre of instruction on the precautions necessary to prevent the spread of hookworms and other intestinal parasites.

MEYER and RAMAKRISHNAN (p. 471) have investigated the escape of infective larvae from the proboscis of *C. fatigans* and their entry into the skin of the bitten host. Warmth of about 36°C stimulates the larvae to escape but they do not penetrate unbroken skin.

DRIVARIOTIS and ARNA (p. 707) comment on the absence of records of filarial lesions of the spleen in the post mortem reports of a Bombay hospital and describe their findings in the examination of 11 spleens at that hospital all of which showed lesions readily detected by the naked eye and proved microscopically to be of filarial origin. Histologically these swellings were granulomata and microfilariae subsequently identified as *S. d. ophi* were found in each. Six of the spleens were normal in size, two were smaller than normal and three were enlarged. RAO and SUBRAMANIAM (p. 183) show that there is an annual increase in the incidence of filarial lymphangitis in Calcutta during the monsoon period July to September.

EARLE (p. 571) reports good results from the use of sulphapyridine in certain complications of filariasis such as lymphangitis in *N. aurum*. YOSHIKI and filarial abscess were not influenced by the drug. He (p. 51) states that the good results in lymphangitis probably indicate that the complication is due to secondary streptococcal infection. On page 156 an account of a discussion on surgical complication of filaria is given. The detail cannot be further abstracted but it may be noted that R. A. regards the lymphangitis as due to the direct effect of the worms though in a large number of cases there is superadded pyogenic infection in treatment. Sulphanilamide has been successful even when no secondary streptococcal infection was present.

JUDGE (p. 83) describes the methods he adopts in the operative treatment of elephantiasis of the leg. Detail may be found in the original abstract which cannot usefully be further condensed. The object of treatment should be thorough removal of inflamed proliferative tissue and the creation of new lymph channels. The latter is achieved by making numerous windows in the fasciae covering the muscles through which silk thread are passed to act as wicks.

FALSTAD (p. 159) have found a single adult male heartworm in the inferior vena cava of an aged negress in New Orleans. No microfilariae were present. The specimen differed from other species of *Dirofilaria immitis* named. *D. of Louisiana* is a new species. Revere hosts must exist but are not known.

BROWN and SHELTON (p. 190) have found that a combined course of sulphanilamide and Fovadin continued for 10 days is effective against *D. immitis* in dogs. Five dogs were rendered free of the microfilariae and in the sixth the count was reduced 96 per cent. In four no adult worms were found at autopsy, worm some of the remaining were found in the other two but no larvae were present in the four male worms examined.

WOODMAN and BOKHARI (p. 188) note that in the Sudan infection with *D. immitis* found in 10-20 per cent of the population. Larvae were found in *C. fatigans* but the development was slow to the vector with an account of the lesions produced by the infection in man. The authors doubt if there is any drug which will destroy microfilariae of any species and spare the host (but see BROWN and SHELTON above).

NETTEL (p. 512) discusses the localization of nodules in onchocerciasis and emphasizes the importance of a thorough search of the

external auditory meatus. The seriousness of this localization is shown by the fact that of 40 persons suffering from filarial blindness all had periauricular nodules.

ELLIOTT (p 778) discusses the clinical aspect of dracontiasis pointing out that if the worm is deep or is burrowing along fascial planes a misdiagnosis of deep cellulitis myositis perostitis or even sciatica may be made. He has had success in treatment by means of local injections of phenothiazine emulsified in olive oil and adeps lanæ [in a strength presumably of 1 gm in 20 cc]. The warmed emulsion is injected at points along the track of the worm after local anaesthesia has been induced and the sites of injection are firmly massaged. The author claims that no ill effects were seen with doses of 2 gm phenothiazine given weekly for four weeks. After the injections the worm can be withdrawn in the usual way.

JOB (p 633) has found that glassfishes of the genus *Ambassis* feed voraciously on Cyclops. They are found in India in both standing and running water and may be useful in the biological control of guinea worm disease.

Enterobius and Trichinella Infections

JONES and JACOBS (p 192) show that almost 70 per cent of eggs of *E. vermicularis* survive for 48 hours when kept in moist cool air but that the survival rate is only about 10 in dry cool air and is nil in dry warm air. The value of dry atmospheres and high temperatures in control is indicated.

CRAM (p 191) refers to investigations on *Enterobius* infections carried out in white and negro families. The results have made apparent the frequency of infection of several members or whole families and this fact is of the greatest importance in treatment and prevention. In almost half the white families all the children were infected and in about half of them one or more adults were also infected.

CRAM *et al* (p 191) point out that *Enterobius* infection is liable to be extremely prevalent in institutions such as schools orphanages or mental hospitals.

HILLMAN (p 877) describes the clinical picture which may be occasioned by infestation of the appendix by *Enterobius vermicularis*. The usual history is of recurring attacks of appendicitis of a mild type but the picture varies greatly and the condition often cannot be differentiated from acute appendicitis. As a rule in the appendix there are no inflammatory changes and no characteristic pathological picture. In young girls with this syndrome *Enterobius* infection should be suspected. ASHBURN (p 634) moreover has found that *Enterobius* is present as often in normal appendices as in those which show chronic inflammation and more often than in those acutely inflamed. He concludes that this worm is not aetiologically related to appendicitis.

OELKERS and ZESSLER (p 709) have tested various anthelmintics on *Enterobius* larvae kept alive *in vitro*. Their resistance is usually high. Santonin in saturated solution does not kill them and filmaron, ascaridol and pyrethrin may have no effect even after long periods. Certain thymol derivatives and ethereal oils have proved relatively lethal.

MILLER and ALLEN (p 781) report on phenothiazine in the treatment of *Enterobius* infections noting that there were some toxic effects. They conclude that this drug is probably more effective than gentian.

violet but before recommending its use for children they advise that further study should be made of its haemolytic and toxic properties.

MAPLESTONE and BHADURI (p 78²) have found *Trichinella spiralis* in a cat in India—this is the first authentic record of this parasite in India. They discuss the life history of the worm, its hosts and the difficulties in prevention of human infection.

LEVIN (p 193) calculates that larvae of *Trichinella spiralis* enter the muscles of rats (infected by introduction of larvae into the stomach) from the 6th to the 12th day after infection, though adults are found in the intestine up to the 16th day.

WARENS *et al* (p 194) record the finding in muscle tissue of cysts of *T. spiralis* during microscopic examination of tonsils, thyroid tissue and other material from patients from whom no history suggestive of trichiniasis could be obtained.

DAMMIV (p 194) found *Trichinella* larvae in 5 cc of blood drawn from the brachial artery of a man 16 days after he had eaten uncooked pork and in whom symptoms suggestive of trichiniasis had developed. The procedure is advised for diagnosis. The patient developed a positive Widal reaction and gave a delayed positive intradermal test to *Trichinella* antigen.

BEESON (p 196) gives a good account of the signs and symptoms of trichiniasis, details of which may be found in the original abstract. He notes that search for the adult worm in the faeces is usually a waste of time but that larvae are often to be found in the sediment from 5 cc of blood laked in 50 cc of water and centrifuged. After the third week biopsy of muscle is useful. Eosinophilia may reach 40 per cent in the second and third weeks and may persist for a year. He refers to the intradermal and precipitin tests described by McNAUGHT *et al* below. A positive Widal reaction may be present in the acute stage [see DAMMIV above].

DELLA VIDA and DYKE (p 197) describe the blood changes in trichiniasis. There is leucocytosis with peaks in the third and eleventh weeks after the onset of symptoms and during these waves the eosinophils are greatly increased.

McNAUGHT *et al* (p 194) describe the procedure for the preparation of antigen for cutaneous and precipitin tests for trichiniasis; the details may be found in the original abstract. The intradermal test performed with a saline control shows in positive cases an immediate reaction consisting of a wheal surrounded by a zone of erythema or a delayed reaction which reaches its maximum in 24 hours and appears as a swollen red area 1–3 cm in diameter. Most patients in the acute stage give the immediate reaction; the delayed type occurs in early stages and in long-standing quiescent cases. The precipitin reaction may be obtained after one hour in a water bath at 37.5°C. Both tests may give positive results years after the initial infection.

MAUSS (p 57) states that the immunologically active fraction of trichinous rabbit serum is the globulin and especially the euglobulin fraction.

C. H. Wilcocks

RABIES

A REVIEW OF RECENT ARTICLES—\\ \\ \\ *

1—*Virus*

KLIGLER and BERNKOPF¹ have made some interesting observations in experiments to ascertain the localization and dissemination of virus following infection by various routes in normal and immunized mice. The neurotropism of the virus of rabies was established in the early studies on the disease and a considerable amount of evidence has accumulated now to support strongly the view that the propagation of the virus in the body is along nerve paths only. This evidence is not limited as the authors suggest to observations made on the localization of the virus in the tissues at the time of death or to observations made in histological studies only. Nevertheless it must be agreed that much of the experimental evidence is based on observations following upon inoculation of the virus directly into nervous tissue whether central or peripheral and on studies on the effects resulting from resection of nerves before or after such infection.

In the first series of experiments of the present authors groups of mice three weeks old were infected intraperitoneally or subcutaneously with 0.5 cc of a 1:50 suspension of virus infected mouse brain and at stated intervals two of the infected mice were killed and various tissues were examined for the presence of virus by inoculation of suspensions intracerebrally into three mice. In a second experiment the mice were infected subcutaneously, one group in the hind and the other in the fore limb with 0.2 cc of a 1:20 brain suspension. Eight experiments were made with minor variations but fairly uniform results. Although not mentioned in the protocols other mice were inoculated intramuscularly but the dose of virus suspension is not given. The mice remaining after the lapse of 120 hours were left as controls and all of them died of typical infection or with typical paralysis. It is not stated whether a street or fixed strain of virus was used in these experiments. The virus inoculated intraperitoneally into mice was usually demonstrable during the first six hours in the peritoneal washings, the mesenteric axillary and inguinal lymph glands in the liver and spleen but was no longer demonstrable after 24 hours in these tissues. No virus was demonstrable in nervous tissues in the early periods but it was detected from 72 hours onwards in the cord and other parts of the c.n.s. The authors state that after peritoneal infection the cervical cord is always the first segment invaded thus indicating some pathway of predilection of the virus from the peritoneal cavity to the cord and that the nerve invasion takes place in the peritoneal cavity and not in the glands. [This may be true but their evidence does not appear to be conclusive (see Tables I, III and V). In five experiments out of 14 the virus was recovered from the cervical cord from the 72nd to the 96th hour but the results of only four experiments for the examination of lumbar cord are recorded.]

The greater part of the virus inoculated intraperitoneally appears to be destroyed in various glands during the first 24 hours. The small

For the thirty eighth of this series see this *Bulletin* Vol 40 p 195

¹ KLIGLER (I. J.) & BERNKOPF (H.) The Path of Dissemination of Rabies Virus in the Body of Normal and Immunized Mice—*Brit Jl Experim Path* 1943 Feb Vol 24 No 1 pp 15-21

amount of virus actually invading the nerves seems to need up to 12 hours for multiplication and extension along the nerve paths before it has reached the cord and is present there in detectable amounts. It is later found in all parts of the central nervous system. The virus was demonstrable at the site of inoculation and occasionally in the regional lymph nodes of mice four to 18 hours but not 24 hours after subcutaneous inoculation. There was no general lymphatic distribution as in the case of intraperitoneal inoculation and virus was not detected in the liver and spleen. After 72 hours the virus was detected in the cord the part first invaded depending on the site of infection. Later on it was found in all parts of the central nervous system.

Virus inoculated intramuscularly was recovered from the site of inoculation within four to 18 hours and in one instance only later than this. Virus was recovered from lymphatic glands on two occasions and then only in those proximal to the point of inoculation. No virus was recovered from the liver and spleen. Only after the disease had advanced to the stage of paralysis (even day) was virus recovered again from the site of inoculation and the lymphatic glands subsequent centrifugal spread. Mice inoculated in the foreleg showed virus first in the cervical cord at 72 hours and later in other parts of the CNS. Those inoculated in the hind leg showed virus first in the lumbar cord at 72 hours. It is recognized that young mice are more susceptible to intraperitoneal infection with rabies virus than old ones. Mice three weeks old and three months old respectively were inoculated intraperitoneally with 0.5 cc of a 1:50 suspension of virus and the organs and tissues were tested for infectivity at intervals up to four days. After 18 hours the virus was no longer detectable in the liver and spleen and lymphatic glands of either group of mice. It was detected in the cord of the three-weeks-old but not the three-months-old mice examined on the fourth day. However in older mice which succumbed to the infection the virus was detected in the cord as in the young mice. The authors believe that the widespread lymphatic distribution of the virus after intraperitoneal inoculation and its subsequent destruction offer a possible explanation of the relative insusceptibility of older mice to this route of infection as well as for the better immunization effect of intraperitoneal as compared with subcutaneous injection.

In immunized mice (formalin treated virus) virus inoculated intraperitoneally disappeared more quickly from the peritoneal cavity than in untreated mice if the degree of immunity was sufficient. In these mice and also in immunized mice inoculated subcutaneously in the limbs with virus if the immunity was not adequate to prevent the virus from reaching the cord no difference was observed in the rate of spread of the virus to other parts of the CNS in immunized as compared with untreated mice. The mechanism of immunity consists apparently in a rapid destruction of the virus during the first hours after infection.

[The Wee sleekit cooing timorous beastie appears to have become the subject of much controversy. Toward the end of last century BABES reported that mice were susceptible to rabies. REVLINGER in 1904 and GALLI VALERIO in 1905 showed that they could be infected even by the subcutaneous route. Perhaps because BABES in 1892 drew attention to the fact that mice could develop the furious form of rabies and recommended that great care should be taken in handling mice in the later stages to avoid being bitten the mouse was not favoured as a laboratory animal for the study of this

disease The rabbit because even when inoculated with street virus it developed only paralytic symptoms came to be the animal of choice for the study of this disease and of course PASTEUR's classical work was done with this animal]

Since WEBSTER and DAWSON [this *Bulletin* 1935 Vol 32 p 608] recorded the use of the mouse for the early diagnosis of rabies it has become increasingly popular in America both for that purpose and for the evaluation of the immunizing power of anti rabies vaccines [see e.g. HABEL (1940) this *Bulletin* 1941 Vol 38 p 161] REMLINGER and BAILLY³ now report their observations on the use of the mouse for the experimental study of rabies They had read among others WEBSTER's paper [this *Bulletin* 1940 Vol 37 p 619] in which it was suggested that the traditional rabbit should be replaced by the Swiss mouse in the study of rabies The present authors failed to find any Swiss mice which the American workers reported to be specially susceptible to neurotropic viruses including rabies even in Switzerland¹ As they discovered that this Swiss mouse is not a zoological species but a strain arising by mutation in a breeding stock in New York and they could not procure mice from this stock easily they resorted first to the grey mouse (*Mus musculus*) Later when it became difficult to find the traditional rabbit in the markets for experimental purposes or the price was prohibitive they used the banale souris blanche They come to the general conclusion that the mouse is more susceptible to infection with rabies virus than the rabbit and equal if not superior to the guinea pig in receptivity The number of animals used in comparative tests was small and as it is not proposed that only one mouse should be inoculated in making a diagnosis of rabies it is hardly justifiable to conclude that in some cases a quicker diagnosis could be made in the guinea pig than in the mouse and that in other instances it was a question whether the mouse did not behave like the rabbit and the guinea pig They state that since the incubation period is shorter and the mouse appears to be more susceptible to smaller doses of virus *a priori* it would appear to be advisable to employ the mouse if it is pressing to confirm a diagnosis or if suspect material contains or is likely to contain only a trace of virus However they are of the opinion that these advantages are counterbalanced by the shortness of the disease in the mouse and the variability of the clinical picture In some cases owing to the shortness of the disease mice are found dead and it is necessary to passage and examine the brain for Negri bodies [WEBSTER this *Bulletin* 1937 Vol 34 p 677 suggested inoculating six mice with suspected material killing one animal on the fifth sixth and seventh days respectively and examining their brains for Negri bodies and keeping the other three until symptoms developed SULLIN and WILLETT (this *Bulletin* 1940 Vol 37 p 194) also consider that the demonstration of Negri bodies in inoculated mice is the only dependable criterion for a positive diagnosis since the clinical manifestations are too variable and indefinite to be of value] Remlinger and Bailly³ are of the opinion that the symptomatology in the grey mouse (*Mus musculus*) and the

² REMLINGER (P) & BAILLY (J) La souris peut-elle remplacer le lapin dans l'étude expérimentale de la rage? (Première mémoire)—*Arch Inst Pasteur d'Algérie* 1940 Dec Vol 18 No 4 pp 366-373

³ REMLINGER (P) & BAILLY (J) Les formes cliniques de la rage de la souris blanche—*Arch Inst Pasteur d'Algérie* 1940 Mar Vol 18 No 1 pp 1-9

white mouse is similar and judging from reports the behaviour of these mice and the Swiss mouse to inoculation with rabies virus is the same (JOHNSON and LEACH [this *Bulletin* 1941 Vol 38 p 159] have reported no essential difference in the susceptibility of 10 different strains of white mice to rabies virus.)

As in the guinea pig the symptoms are very polymorphic and the authors refer to two main types in the mouse. Furious and Paralytic. Under the general heading Furious rabies in the mouse they describe —

(a) the ordinary classical type (b) the self mutilating form and (c) the pruriginous type. It is important to note that Remlinger and Bailly have apparently observed furious rabies both in the grey and the white mouse [LEACH (this *Bulletin* 1938 Vol 35 p 644) recorded some experiments with the field mouse (*Peromyscus polionotus polionotus*). He reported that they showed a slightly greater resistance to rabies virus than white mice and were more excitable and difficult to handle. Furthermore some developed furious rabies. Some showed early symptoms and recovered but not if the paralytic stage was reached. He stated also that of 5339 white mice inoculated none had shown the furious type of disease.] Babes's warning has been mentioned already. Galh Valerio reported that mice could transmit the disease from one to another by bite and Remlinger in 1905 reported a case of human rabies produced by the bite of a mouse. A word of caution is therefore necessary as to the handling of mice infected with rabies virus and attention is drawn to the possible danger to laboratory assistants during feeding operations. [Another possibility which should be mentioned is the danger of an excitable infected mouse escaping. The furious type of disease is observed both after intracerebral and after intramuscular inoculation especially if street virus freshly recovered from rabid dog is under investigation and is generally accompanied by some paralytic symptoms which later dominate the clinical picture.]

(b) The furious self mutilating type is observed after intramuscular inoculation of virus. The animal is crouched in a corner but if disturbed becomes agitated and utters piercing squeals and bites first at the site of inoculation and later the extremities. The mutilating frenzy increases, lasts for about 24 hours and later paralytic phenomena dominate.

(c) The pruriginous type of furious rabies develops suddenly and the pruritus may be confined to the point of inoculation or be generalized. If localized lesions may vary from depilation to a bleeding area. If generalized the animal scratches itself everywhere. At the same time locomotor effects observed vary from fibrillar shaking of the head and neck to paralytic effects which rapidly gain ascendancy until death ensues.

Under the general heading of the paralytic form the authors describe (a) the common paralytic form (b) the hemiplegic type and (c) ascending paralysis (Landry). In addition they describe the remittent form the pseudo-tetanic or spasmodic form and the thunderbolt and abortive types.

In general the symptoms are characterized by polymorphism and while the furious type in the mouse is determined above all by unpassaged street virus and the paralytic form by fixed or passaged virus there are exceptions.

The authors have not studied the age of the mouse in relation to susceptibility and symptomatology. CASALS [this *Bulletin* 1941 Vol 38 p 160] has however made some observations on these points to which Remlinger and Bailly refer. These latter authors would probably agree that the white mouse has certain advantages for use as a test animal in the diagnosis of rabies and in the estimation of potency of anti rabies vaccines. The animals are cheap and generally the incubation period is shorter than in other animals. points of great advantage in the diagnosis of rabies by animal inoculation. Although it has been reported in the literature that material diagnosed as positive for rabies by microscopic methods (Negri bodies) has in about 10-12 per cent of cases led to a negative result in mouse tests what is more important is that material which was diagnosed as negative by microscopic methods and even on occasion (although these occasions would not survive a statistical analysis) by rabbit and guinea pig inoculation has resulted in the development of rabies when inoculated into mice in about the same percentage of instances. The disadvantage of the mouse for certain experiments and tests is obvious and although furious rabies in white mice has not apparently been observed in America it has now been reported by Remlinger and Bailly and precautions should be taken in working with mice [Personally the reviewer is of the opinion that although the rabbit is more expensive if the same care was taken in selecting strains of rabbit such as for example a Dutch Himalayan cross breeding them under good conditions and selecting only young rabbits as is done in the case of mice then more uniformity in results could be obtained with the traditional rabbit. This is seldom done and in many institutes rabbits are purchased at random in the open market or from dealers who have collected them from widely different sources]

11 — *Methods of treatment and statistics*

In the course of previous experiments LEACH and JOHNSON⁴ [this *Bulletin* 1941 Vol 38 p 496 and 1942 Vol 39 p 591] reported that a single dose of 5 cc of the commercial chloroform inactivated anti rabies vaccine which they tested when inoculated subcutaneously into dogs afforded a high degree of resistance to the intramuscular inoculation of rabies street virus. Their results as in the present paper had been subjected to statistical analysis. The vaccine is a 33½ per cent suspension of brain material from sheep infected with fixed rabies virus treated with 1 per cent chloroform in the cold with periodic shaking for a period of 30 days until non infective for mice by intracerebral inoculation.

A single lot of the commercial chloroform inactivated anti rabies vaccine was tested for potency in dogs 4.5, 10.5 and 16.5 months after preparation (storage at 5 C). The dose of vaccine administered was 5 cc subcutaneously as in previous tests. The test for immunity in the vaccinated dogs was the inoculation in parallel with a similar number of untreated animals 30 days later of 0.5 cc of street rabies virus into each masseter muscle. There were at least 30 dogs in each group. The test animals were kept under observation for a period of 90 days. Autopsies were made on all dogs which died.

⁴ LEACH (Charles N.) & JOHNSON (Harald N.) Effect of Prolonged Storage on the Antigenicity of Chloroform Inactivated Canine Rabies Vaccine — *Amer J Public Health* 1942 Dec Vol 32 No 1 pp 1380-1388

Their brains were examined for Veron bodies and if the result was negative 0.03 cc of a 10 per cent suspension of various parts of the brain was inoculated intracerebrally into four white mice. The results are given in the following table —

Virus	Inoculation			Control			Statistical Significance
	Injected	Dose	Percentage	Injected	Dose	Percentage	
4	3	4	6	36	0	56	0.0000
10	35		11	41		66	0.0000
16	40	6	1	9	7	64	0.0000

By method of observation. Lethality of the virus. Difference in results.

Although there was suggestive evidence that the antigenicity of the product was slightly reduced on prolonged storage if the control group were taken into account the differences in results could have resulted from chance alone.

The present regulations governing the marketing of canine rabies vaccines in America require that the date of preparation be noted on the label and that the expiration date be given as one year from the date of preparation.

From the results recorded in this paper it is evident that the antigenicity is well maintained for a period of one year.

WEBSTER (this Bulletin 1940 Vol 37 p 619) and WEBSTER and CASALS (this Bulletin 1943 Vol 40 p 701) in comparative test made in mice and dogs have reported unfavorably on the commercial chloroform inactivated and especially carbolyzed anti rabies vaccines which they have examined. They have recorded good results in experiments in dogs with anti rabies vaccine prepared by inactivation of a suspension of the brain tissue of dogs infected with rabies virus (Pasteur Paris strain) by irradiation with ultraviolet light. Johnson and Leach on the other hand in the papers referred to above have recorded good results with both commercial chloroform treated (fixed virus sheep brain) and commercial phenol treated (fixed virus horse brain) vaccines provided that the same concentration of brain suspension 33 1/3 per cent was employed. It is difficult to make comparison of the results reported by the two teams as the percentage of control untreated dogs succumb to the intramuscular test dose is higher in the experiments by Webster and Casals (80-90 per cent) than in those of Leach and Johnson (55-66 per cent) and other factors may

Although owing to unfortunate circumstances which have arisen affecting one of the groups of workers it is not possible at present it could be extremely useful for the two sets of workers to compare the same vaccines in a parallel series of tests in dogs. It might then become possible to form an opinion as to whether the carbolyzed and chloroform treated vaccines under discussion are equivalent to or less in potency than the irradiated vaccine. If it were found that the ultraviolet treated vaccine was consistently superior to the others in protecting dogs in the experiments by Webster and Casals infected dog brain tissue (homologous) and the Pasteur Paris fixed

rabies virus strain play a greater part in the results than the method of inactivation of the virus²]

CHÁVEZ⁵ reports that a carbolized non virulent vaccine has been employed for a period of 12 years in the Institute at Santiago for the treatment of more than 6 000 human patients with good results. The accidents [*vide infra* under section on post vaccinal paralysis etc.] which occurred were slight and only two deaths occurred and these were of patients bitten on the head a mortality of 0.03 per cent. In Santiago rabies is endemic and all persons bitten by dogs are treated but all the 6 038 cases treated belonged to categories A B and C. If the living dog which bit the patient can be kept under observation several injections are given and if nothing happens after 10 days treatment is stopped. In all other cases the complete treatment is given if the animal was not observed and even if the examination for Negri bodies gave a negative result. In about 10 per cent of cases in which no Negri bodies were found a diagnosis of rabies was made by animal inoculations. Four per cent brain substance is used for the vaccine and this is treated with 1 per cent carbolic acid for 24 hours at 37 C. (a) patients with head bites receive 30 doses in 20 days (4.8 gm.) two doses for first 10 days. (b) patients bitten elsewhere 3.2 gm. in 20 doses one per day. (c) patients with no lesions 2.24 gm. in 14 doses one per day.

In 1935 there was an epizootic of rabies in Santiago. 1 051 dogs were examined for rabies and in 217 a positive diagnosis was made. 983 persons were bitten by rabid dogs or dogs suspected of rabies. In 12 years 10 099 animals responsible for bites were examined for rabies and in 857 or 8.4 per cent the diagnosis was confirmed.

III.—Post Vaccinal Paralysis and other Accidents

BÉGUET and HOPPENBERGER⁶ make observations on the results of an enquiry into the untoward effects observed in certain patients receiving carbolized anti rabies vaccines. Similar cases have been referred to by others [see BERNARD LEPIE NOURY and RAYNAL and LILOU this *Bulletin* 1940 Vol 37 pp 620-621] and were reported as far back as 1919 by CORNWALL in India [*Indian J. Med. Res.* 1919 Vol 6 p 237]. The unpleasant symptoms appear generally after the 10th injection and comprise violent headache great anguish loss of consciousness with considerable slowing or stoppage of the pulse and in certain case an unpleasant taste in the mouth. They appear about 5 minutes after the inoculation. In most cases there is a more or less rapid return to normal after development of pallor cold sweats nausea vertigo sometimes with vomiting and incontinence of urine. In slight cases the patients get up after 10-15 minutes while in the worst cases in spite of stimulating injections of ether and camphorated oil they do not recover for several hours. The fact that all the cases were in the group of patients treated with carbolized vaccine excluded the possibility of their being due to emotion from undergoing treatment. They are undesirable because

⁵ CHÁVEZ (Federico). Vacunación antirrábica humana en Santiago de Chile. Resultados obtenidos con el uso de vacunas fénicadas durante el período de 1929-1940.—*Rev. Inst. Bacteriol. Chile* 1940 Dec Vol 7 No 1-2 pp 17-23. With 2 graphs.

⁶ BÉGUET (M.) & HOPPENBERGER (R.) Enquête sur les incidents observés au cours de la vaccination antirabique par le vaccin phéniqué.—*Arch. Inst. Pasteur d'Algérie* 1940 June Vol 18 No 2 pp 179-0.

the countries in which the chief biting animal is the dog. The recent observation of KUBES and GALLIA (this *Bulletin* 1943 Vol 40 p 208) in tests in mice which require confirmation are of interest in this connexion. They report from Venezuela that they have found immunological differences between strains of virus from cases of paralytic rabies supposed to be spread by bats and strains of virus of canine origin (Pasteur group). A vaccine made from the Pasteur fixed virus strain did not protect mice well against the strain of virus associated with paralytic rabies (bats) although it conferred a good protection against the Pasteur group viruses (canine). On the other hand a vaccine made from a fixed strain of virus recovered from cases of paralytic rabies showed according to them a polyvalent antigenic action.

Ian A. Galloca

References to this interesting subject of paralytic accidents following antirabic treatment have been numerous in this *Bulletin* since 1929. See 1929 Vol 6 pp 223-730, 1930 Vol 27 pp 254-751, 1931 Vol 28 pp 25-750, 1932 Vol 29 p 603, 1933 Vol 30 pp 143-586, 1934 Vol 31 pp 149-646, 1935 Vol 32 pp 179-617, 1936 Vol 33 p 374, 1937 Vol 34 p 237, 1938 Vol 35 p 653, 1939 Vol 36 p 730, 1941 Vol 38 p 497. In most of these and other references are given.—Ed

JOHN ON (H N) *The Significance of the Negri Body in the Diagnosis and Epidemiology of Rabies*—*Illus Med J* 1942 Vol 81 No 5 Reprint pp 19 [Summary taken from *Lett B* 11 1943 June Vol 13 No 6 p 209 Initialled J E]

J reports the results of a series of observations on dogs and foxes with the object of assessing the value of microscopic examination for the diagnosis of rabies. Of 771 dog brains (suspected cases of rabies) examined over one year in Alabama 600 were positive by mouse inoculation and 623 of them were positive microscopically, i.e. 100 per cent of these cases of rabies were Negri negative.

404 fox brains obtained casually and including some from an outbreak of rabies in foxes were also examined. 128 were positive, 116 of which were Negri positive giving an error of 10 per cent. All the mouse positive and Negri negative cases were foxes concerned in the outbreak.

Brains of vaccinated dogs which died of rabies after natural infection in Alabama were similarly examined. 92 were mouse positive and 14 per cent of these were Negri negative.

Of 188 dogs which died of rabies during vaccination experiments 39.7 per cent were Negri negative, these being mostly dogs affected with paralytic rabies. In the experiments the period of incubation and the period of clinical illness were the same in both vaccinated and control groups (21 and 24 days respectively) showing that the vaccination had not been any delaying action against the virus. In this work some evidence was found that Negri body production varies according to the strain of virus.

The article concludes with a useful discussion on the latter and kindred problems.

BRONSHTEIN (N I) & ZAK (O S) Sravnitel'noe izucheniye shtammov fiksirovannogo virusa beshenstva nekotorykh pasterovskikh stantsii [Comparative Study of Different Strains of Fixed Rabies Virus]—*Zh Mikrobiol* Moscow 1942 No 7 pp 81-85 [Summary taken from *I et Bull* 1943 June Vol 13 No 6 p 209 Signed A MOLDAWSKY]

The authors investigated the changes which occurred in fixed virus after many years passing in different laboratories applying the same methods of examination to five industrial strains: Moscow, Ivanova, Tomsk, Tbilisi and Tashkent. Whereas no sharp and essential differences were found in the first four strains regarding MLD and infectiveness by various routes of inoculation for laboratory animals, the Tashkent strain was found to be highly virulent and unstable, thus being unsuitable for use. The Ivanova strain was found to be extremely resistant to drying, losing its virulence only after ten days. 70.6 per cent of mice immunized by Fermi's vaccine prepared from the Moscow strain survived infection as compared with 16.6 per cent of the controls. Fermi's vaccine and Phillips vaccine prepared from the Ivanova strain conferred immunization on 81.8 per cent and 94.4 per cent of mice respectively, only 9.12 per cent of controls resisting infection. In a course of immunization lasting for 25 days, immunity in rabbits against not more than 3-5 MLD was set up. From the tenth day the rabbit sera showed the presence of antibodies; after the 25th day, sera from the majority of the rabbits neutralized 20 MLD in a dilution of 1/10. Rabbits immunized with the Moscow and Tbilisi strains in some cases showed a decrease of antibodies towards the 25th day.

KUBES (V) & GALLIA (F) Fenomeno de para inmunidad entre los virus de la encefalomyelitis equina y de la rabia paralitica de Venezuela [A Para Immunity Phenomenon between the Equine Encephalomyelitis and Paralytic Rabies Viruses of Venezuela]—*Bol Inst Investigaciones Vet* Caracas 1942 Nov Vol 1 No 3 pp 81-101 [11 refs] English summary

The immunological relationship between two native heterologous viruses is studied: (1) fixed bovine rabies virus and (2) equine encephalomyelitis virus. The resulting para immunity phenomenon was paid special attention, particularly whether in its appearance there play a part in addition to virus antigens the proteinic substances in the products used for immunization. Swiss mice were employed as test animals.

The studies comprised three parts:

- (1) *In vivo* cross immunity tests
- (2) *In vitro* cross immunity tests
- (3) Tests on the stimulating action of the proteinic substances in the vaccines

The first part consisted in vaccination of a group of mice against the rabies virus and of another group against the encephalomyelitis virus. Then either group was inoculated intracranially with the heterologous virus in serial dilutions. Non-vaccinated mice inoculated simultaneously with equal dilutions and in the same way served as controls.

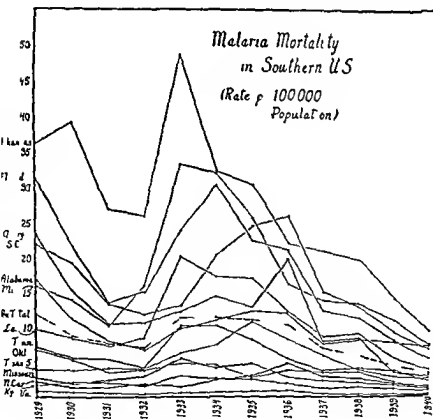
The second part comprised serum cross neutralizations. The required anti-rabic and anti-encephalomyelitic immune sera were

Its main breeding season is from July to October. There was a remarkable correlation between the prevalence of *A. philippinensis* and the spleen rate in the different villages. Ponds are the favoured breeding places of this species and there was no marked difference in the number and variety of such ponds. They exist in all eight villages alike. The manner in which a high subsoil water level acts as a deterrent to the breeding of *A. philippinensis* is not explained. Other species of *Anopheles* breed in abundance in these conditions. It would seem probable that the raising of the water table in the Bengal delta would lower the incidence of malaria.

No man W / ste

FALST (Ernest Carroll) & DE BAKEN (Lois) Malaria Mortality in the Southern United States for the Year 1940 with Supplementary Data on Malaria in other States—*Jl National Malaria Soc* Tallahassee Fla 1942 Vol I No I pp 125-131 With 2 figs

The malaria mortality in the Southern United States in 1939 was the lowest then on record [the *Bulletin* 1942 Vol 39 p 388]. The year



Graph showing the malaria mortality rates for fifteen Southern States (1929-1940). The book is represented by the graph of the following

[Reported from the *Jl National Malaria Soc* Tallahassee Fla]

1940 witnessed a still further decline the average malaria mortality rate of the 14 endemic malaria States being only 3.02 per 100,000. The trend is illustrated in the graph reproduced from this report.

The 5-7 year cyclic increase in malaria deaths which was expected in 1938-1940 failed to materialize. It is possible that the declining mortality since 1938 may be due in part to improved economic conditions of the poorer members of the population. The high rates of 1933-1936 were experienced when the Southern States were feeling the full effects of economic depression. There has been however increased antimalaria activity. It is pointed out that the malaria death rate is a direct reflection of *P. falciparum* malaria only but there is evidence that *P. malar* malaria has also decreased.

Norman White

WATSON (Robert Briggs) MAHER (Helen C.) & RICE (Margaret E.)
Observations on Malaria around Lake Wilson 1934-1941—*Jl National Malaria Soc* Tallahassee Fla 1942 Vol 1 No 1
pp 33-44 With 2 figs

Lake Wilson the smallest of the Tennessee River impounded water projects was formed in 1924 by the completion of the Wilson Dam. It has 135 miles of shoreline. The only shallow water is over the flood plains of small tributary streams. A population of about 4,800 lives within a mile of the lake shore. Such anophelism as occurs is almost entirely due to mosquito breeding in the lake. Compared with other Tennessee Valley lakes this anophelism has from 1934 to 1941 been at a low level. In the autumn of each of these eight years blood examinations have been made of 12 to 34 per cent of the population living within the mile limit. Over the whole period parasites were found in 3.58 per cent of the bloods examined. Infection rates varied inversely with the distance from the lake. Infection rates were higher for negroes than for whites. There is evidence that cyclic increases in malaria prevalence occur every fifth year.

Norman White

EMMEL (L.) GOLZ (E.) & JAKOB (A.) Elektronenoptische Untersuchungen an Malaria Sporoziten [Electron optical Observations on Malaria Sporozoites]—*Deut Trop Ztschr* 1942 Dec 1
Vol 46 No 23 pp 573-575 With 3 figs

In an earlier paper [this *Bulletin* 1943 Vol 40 p 214] some details of the structure of malarial sporozoites as revealed by the electron microscope were given. In the present paper it is noted that further observations have disclosed longitudinal markings or thickening of the periplast which are compared with the myonemes of ciliates or gregarines. These markings are more numerous and more conspicuous at one end than they are at the other and are related to the greater mobility of the anterior end of the sporozoite.

C. M. Ilenson

LEWIS (D. J.) A Northern Record of *Anopheles gambiae* Giles (Dipt Culicidae)—*Proc Roy Entom Soc London* (B) 1942 Vol 11 Pt 9 pp 141-142 [Summary taken from *Rev Applied Entom Ser B* 1943 May Vol 31 Pt 5 p 88]

In May 1941 two males and four females of *Anopheles gambiae* Giles were bred from larvae collected in river pools about eight miles

north of Wadi Halfa and a few miles south of the Egyptian frontier. The northernmost point from which this species had previously been recorded in the Ethiopian Region is Zeidab (17° 26' N lat). In a paper already noticed de Meillon discussed its distribution near its southern limit in the Transvaal and stated that it is present only in summer in the area with a range of temperature of between 41 and 45° F and with 0-50 days of frost a year. Wadi Halfa has 0-2 days of frost a year and a temperature range of 60° F. The difference between the mean maximum for June and the mean minimum for January (1902-1934)

SWIFT (W. C.) FENC (L. C.) CHOW (C. Y.) & HSI (S. C.) Anophelines of Southwestern Yunnan and their Relation to Malaria—*Jl Nat o lat Mal ria Soc Tallahassee Fla 1942 Vol 1 No 1 pp 25-39*

In 1940 the International Health Division of the Rockefeller Foundation established a laboratory in Chefang, Yunnan Province for the study of malaria in a building previously used by the United States Public Health Service Malaria Commission [this *Bulletin* 1941 Vol 38 p 502]. This report records some of the results of that laboratory's investigations during the first 16 months.

The village of Chefang lies at the northern end of a hill-encircled valley and is the headquarters of a Shan State on the Burma border. It is 7700 feet above sea level. The valley is about 20 miles long and 10 miles broad with many side valleys. It has a population of about 25,000. Rice is the chief crop. There is a rainy season from May to October. The observations recorded all concern this valley.

Twenty-one species or varieties of Anopheles were identified: *A. acrotis*, *A. aikem*, *A. anadalei* var. *interruptus*, *A. annularis*, *A. barbostri*, *A. culicifacies*, *A. flutator*, *A. fuscus* var. *baileyi*, *A. hyrcanus* var. *sine sis*, *A. hyrcanus* var. *merimus*, *A. jeyporiensis* var. *candidiensis*, *A. kochi*, *A. leucosplyrus*, *A. lindesayi*, *A. maculatus*, *A. minimus*, *A. splendidus*, *A. subpictus*, *A. stephensi*, *A. tessellatus* and *A. taeni*. Of these species *A. acrotis*, *A. anadalei* var. *interruptus*, *A. leucosplyrus*, *A. subpictus* and *A. stephensi* have not previously been reported from Yunnan or with the exception of *A. subpictus* from China. The authors make certain reservations regarding the identity of *A. flutator*.

A. minimus was by far the most prevalent species, three times more prevalent than *A. hyrcanus* var. *sine sis* which previous authors have found to be the most numerous and widespread species in Yunnan. The total number of anophelines dissected was 26,379 of 13 species. The only species found infected was *A. minimus*. Of 18,707 *A. minimus* dissected, 127 harboured oocysts and 54 sporozoites. The total number infected was 164, an infection rate of 0.9 for the whole valley and for the whole period of 16 months. There appeared to be no malaria transmission in January and February. Infection rates were highest from August to November. *A. minimus* prefers houses to stables as daylight resting places. It has a marked preference for clear flowing water in which to breed and its larvae are very rarely found in rice fields. *A. minimus* is the only vector of any importance in this part of Yunnan.

Norman White

EYLES (Don E.) & BISHOP (Lindsay K.) The Microclimate of Diurnal Resting Places of *Anopheles quadrimaculatus* Say in the Vicinity of Reelfoot Lake—*Public Health Rep* 1943 Feb 7 Vol 58 No 6 pp 217-230 With 4 figs

The authors selected a number of buildings that were used as daytime resting places by *A. quadrimaculatus*. In some of these as many as 10 000 mosquitoes might be found. They then followed the movements of the mosquitoes out of the shelters at dusk and into them at dawn and endeavoured to correlate these movements with changes in the environment. In the evening the mosquitoes move out chiefly during the 20 minutes after sunset. The only climatic factor that could be correlated with this movement was the fall in light intensity. (The fall in temperature and the rise in humidity takes place an hour or two later in the resting place than in the open.) The influence of light was demonstrated by maintaining artificial light in the shelter. By this means a large proportion of the mosquitoes could be made to remain throughout the evening. The inward movement of mosquitoes in the hours after sunrise is more gradual and seems to depend on the time at which direct sunlight strikes the individual mosquitoes in the open. During the day the temperature in the shelters is lower and the humidity higher than outside the mean differences being 7 F and 8 per cent relative humidity. Evaporation (vapour pressure deficit) inside was about two thirds of that outside but evaporation from mosquitoes outside would be enormously increased if they were in direct sunlight or exposed to the wind. I. B. Higglesworth

TREILLARD (M.) *Anopheles hyrcanus* en Provence morphologie et biologie gîtes et refuges [*A. hyrcanus* in Provence]—*Bull Soc Path Exot* 1942 Jan 14 & Feb 11 Vol 35 Nos 1-2 pp 14-18 [10 refs]

SIMEONS (A. T. W.) Economy and Simplification in the Staining of Blood Slides—*Indian Med Ga* 1942 Dec Vol 77 No 12 pp 725-729 With 2 figs

The authors have tested again the method of staining blood films for malarial parasites advocated by BOYE in which the films are stained first by eosin then by Stevenel's blue and again by eosin. The method has the advantage that the films can be fixed in methylated spirit and that ordinary tap water can be used. Slides are easily stained by immersion in a glass cylinder and the stain in the cylinder can be used repeatedly without deterioration. The total time required for a thin film allowing one minute for fixation is under two minutes and for a thick film allowing one minute for dehaemoglobinization just over two minutes. Numbers of slides in a suitable rack can be stained at one time. The authors state that the results are perfectly satisfactory for all routine clinical work. He also emphasizes the advantages of the rapidity of the method which leaves little excuse for the administration of quinine to a patient before an accurate diagnosis has been made. In this way much useless administration of quinine can be avoided an important consideration at the present time. In a footnote to the paper the editor of the *Gazette* says 'This method of staining has been tried by us and found excellent for thick films and useful but not ideal for thin films'.

[The method with detail for the preparation of the stain was described in the review of BOYLE'S paper (1940) in this *Bulletin* 1940 Vol 37 p 737.]

C M Henson

TAREYEV (E M) A Rapid Malig nant Form of Malaria of the Tertian Type (Tertiana Siderans) Abstracted from a translation of an article received by the Anglo-Soviet Medical Council from the Marcinov Central Institution for Malaria and Medical Parasitology. MSS 5 pp

Russian authors have recently described in children and young adults a syndrome characterized by acute cerebral symptoms with death in a few hours. This syndrome has been associated with the presence of *Plasmodium* in the blood and on this account and because other cause has not been found it is suggested that it is a form of acute malaria for which the name *tertiana perniciosa siderans* is tentatively suggested. Tareyev distinguishes between this condition and the well known forms of cerebral malaria due to *P. falciparum*. The acute syndrome may arise in primary infections or in the course of early relapses. It is characterized by sudden onset usually in children apparently perfectly well with shivering, severe headache, vomiting, convulsions, coma, Cheyne Stokes respiration and death in 2-3 hours. It is stated that malaria parasites are relatively scanty in the vessel of the brain in contrast to the usual finding of massive brain infection in comatose malaria due to *P. falciparum* (but in another part of the paper it is stated that the brain is crowded with parasites). The convolutions of the brain are flattened, the fluid in the ventricles and subarachnoid spaces clear and there is no statement that it is in excess quantity. There is no evidence to indicate that the parasite possesses any unusual virulence.

The author attributes the syndrome to anaemia of the brain but does not explain how this is brought about. An allergic condition may be involved since tuberculous caseation of glands and other so called para allergic conditions have been found. Persistence of the thymus has been noted. He gives a warning that cases of meningitis and mushroom poisoning have erroneously been diagnosed as *tertiana perniciosa siderans* and that some cases may resemble heat stroke. Prognosis is very bad but the patient may be saved by injection of quinine or atabrin. See also this *Bulletin* 1943 Vol 40 p 436.

C H

DUTT (Probodh Chandra) A Case of Paroxysmal Haematuria due to Malaria.—*Indian Med Gaz* 1941 Dec Vol 77 No 12 p 735

The patient was a child aged four who had an attack of malaria (mixed *P. vivax* and *P. falciparum* infection) accompanied by the free passage of urine bright red in colour and containing abundant red cells with albumin and a few epithelial casts. Other similar attacks occurred and the haematuria ceased soon after the fever abated under quinine treatment. Urine examined later provided no evidence of renal disease but the Editor of the *Indian Medical Gazette* suggests that malarial nephritis may have been present.

C H

HARMSSEN (H) & HAUIR (A) Serumreaktionen bei Malaria tertiana
Ein Beitrag zur Frage der Unspezifität der Seroreaktionen
[Serum Reactions in Benign Tertian Malaria]—*Deut Med Woch*
1943 Feb 19 Vol 69 No 7 pp 147-152 [24 refs]

The occurrence of non specific serum reactions is now hardly disputed and only their extent and importance remain obscure. A characteristic group of non specific reactions is found in malaria. HEINEMANN observed that the Wassermann reaction in malaria is connected with the appearance of parasites in the blood but can occur when they are absent. He believes that a positive WR of the cerebrospinal fluid is never caused by malaria. HOUENWENT and KOP showed that a positive WR within three months after an attack of malaria is not a proof of syphilitic infection. They found positive reactions even six months after the attack. ASBELOW confirmed Heinemann's observation of a positive WR 18 to 24 days after the disappearance of the parasites from the blood. He found the WR positive in a high percentage of acute cases of malaria but negative in chronic cases. MEYERSTEIN found the WR positive between the fifth and eighth days after the onset of fever in 70 to 80 per cent. after the tenth day it was less common. He observed that a positive reaction was closely connected with the presence of parasites in the blood. SCHWENKINDECHER regards a positive WR as a result of cell destruction with the production of lipid substances in the circulation. The investigations and views of other workers especially those of NATAJE in Rome are referred to.

During the period from April 1941 to August 1942 the authors examined the serum of patients suffering from benign tertian malaria and showing no clinical signs of syphilis. Using the Wassermann Kahn and Meinicke (M K R II) tests they found a positive reaction in 572 out of 1 000 tests. The proportion of positive reactions depends upon how long after the onset of fever the test is made. Many negative results were in relapsed cases. The results are shown in a table which gives the percentages of positive reactions in the three tests. Fresh infections with high fever gave a positive reaction in up to 90 per cent. of cases tested after the fourth or fifth febrile attack. The Kahn test gave most positive reactions and both the Kahn and the WR were usually strongly positive while the Meinicke test often gave doubtful or weakly positive reactions. A characteristic of the non specific serum reaction in malaria is that the WR and Kahn reaction appear when the Meinicke reaction is negative or weak. The serum remains positive for some time after the temperature has fallen and the parasites have disappeared from the blood. Patients with strongly positive reactions usually respond well to treatment and a lasting cure follows. On the other hand in cases with a marked tendency to relapse the serum reaction is usually negative or positive for a very short time only. This is associated with a lack of resistance to the infection a condition which is sometimes seen also in syphilis and in trichiniasis.

J F Corson

DRENOWSKY (A K) Einige Worte ueber die Chinoplasminbehandlung
ambulanter Malariakranker [Quinoplasmoquine in Malaria]—
Deut Trop Ztschr 1943 Jan 15 Vol 47 No 2 pp 51-52

During the malaria seasons of 1940-2 2 460 ambulant malarial patients were treated by 10 15 or 20 day courses of quinoplasmoquine

A. gambiae and *A. funestus* keeping the water muddy (which is useless against *A. gambiae*) the introduction of larvivorous fish such as *Gambusia* and *Lebistes* and of certain plants shading the combined shading and drying of swamps by afforestation which involves enough temporary drainage to enable the trees to become established and wave action and water flow. Few mosquitos can breed in water that is in constant agitation and larvae in moving water usually shelter where the flow is obstructed. Knowledge of this principle was applied at Jinja to the control of *A. gambiae* and *A. funestus* breeding extensively for a distance of several miles along the edge of Lake Victoria in hoof prints in water logged ground on the shore side of a belt of papyrus and in floating debris on the lakeward side. Beginning in 1931 the papyrus and mudbanks were cut away and much of the material so obtained used to raise the bank well above lake level. A nearly straight shoreline of firm steep banks exposed to wave action resulted. The initial cost was fairly high but expenditure on upkeep during the ensuing 10 years has been negligible and breeding along the whole completed stretch has been almost completely eliminated. The same method has recently been applied with complete success to a small lake in Kampala where *A. funestus* bred extensively.

The artificial anti-larval methods are of two kinds permanent and temporary. Into the first category fall the filling in of man made holes no longer required and of small natural hollows and the draining of larger natural hollows and seepages which should not be resorted to unless neither filling nor afforestation is practicable as the ditches themselves may become breeding places unless they are cemented or underground. Temporary control is effected chiefly by larvicides and is not approved of if money is available for more permanent measures. The only larvicides dealt with are oil, Paris green dust and cotton seed tar mixed with kerosene (3:1). This is proposed as a substitute for oil which is now difficult to obtain as Paris green is not considered suitable under East African conditions. Its possible value was suggested by the observation that a stream into which it was discharged from a ginney contained no larvae for a considerable distance below the outlet pipe. It has an objectionable smell which may tend to deter ovipositing females. A large scale experiment with it is in progress [see following abstract].

HOPKINS (G. H. E.) Cotton Seed Tar as a Larvicide — East Africa
Med J 1943 Feb Vol 20 No - pp 41-45

An attempt has been made in Uganda to find some efficient mosquito larvicide which would be cheaper than the imported larvicidal oils. A suitable material has been found in what the author calls gossypix. This is a mixture of three volumes of cotton seed tar with one volume of kerosene. The tar is a by-product formed during the destructive distillation of cotton seed in those ginneries which use producer gas. It is a somewhat viscous dark brown liquid readily miscible with kerosene. After mixing the gossypix is filtered through fine mesh mosquito netting and applied with an ordinary oil sprayer. In laboratory and field tests it proved equal in efficiency to commercial larvicidal oils and the cost is estimated at about one-half. The chief disadvantages are that it is somewhat troublesome to prepare and it is available only during the ginning season.

1 B W. Lesuo th

KNIFE (Fred W) & RUSSELL (Paul F) A Demonstration Project in the Control of Rural Irrigation Malaria by Antilarval Measures — *Jl Malaria Inst of India* 1942 Dec Vol 4 No 4 pp 615-631 With 1 map & 4 figs on 2 plates [17 refs]

The epidemiology of malaria in the Pattukkottai taluk Tanjore District of the Madras Presidency has been described by the authors in previous reports as have the results achieved in malaria control by spray killing adult mosquitoes [this *Bulletin* 1939 Vol 36 p 131]. The taluk was free from malaria before the introduction of irrigation in 1933. *A. culicifacies* is the vector. The present report describes four years work in the control of malaria by measures directed against the breeding of the vector in a group of villages with a population of 3 390 in an area of 7 square miles. In this area there were 3.3 miles of main canal 4.6 miles of branch canal and many miles of poorly designed and ill kept field channels. There were 27 tanks varying in size from a few hundred to several thousand square feet. There were 1 300 wells used for irrigation of ground nuts between January and June the canal water was used for the irrigation of rice from June to January. There were 1 900 acres of irrigated land including 175 acres of swamp and 25 acres of seepage. Countless borrow pits produced *A. culicifacies*.

The malaria control measures employed in undertaking a formidable task included filling and draining tidying of channels the use of Gambusia organic pollution of breeding places the use of Paris green by dustless and automatic methods and intermittent irrigation. Some 55 000 yards of filling were used. The measures were applied step by step and with an additional aim of raising the standard of living by securing better agriculture better roads better washing and bathing facilities.

Noteworthy results were achieved. In three villages the spleen rates in the malaria season of 1937 were 48 54 and 56 in the malaria season of 1941 the spleen rates of these villages were 4 19 and 11. In a comparable untreated village the corresponding spleen rates were 53 and 57. The fall in the parasite rates during the same period was from 42 50 and 49 to 0 10 and 3 in the untreated village it rose from 43 to 48. The total cost of the four years programme was Rs 4 6 0 (6s 6d) per head of population the maintenance cost during a year of observation after the engineering work was completed was Re 0 1 11 (2½d) per head. *Norman White*

ANDREWS (Justin) HOWARD (R S) Jr & TURNER (E Archer) Malaria Control Ditch Lining Experience in a South Georgia County — *Jl National Malaria Soc* Tallahassee Fla 1942 Vol 1 No 1 pp 57-67 With 6 figs on 1 plate & 1 map

LECWEN (W A) & LENERT (Louva G) Circular Joint and Concrete Form Design for Precast Inverts for Malaria Control Ditch Lining — *Ibid* pp 69-82 With 31 figs on 8 plates

Both these papers deal with the engineering aspects of ditch lining a malaria control measure that has a wide field of application in rural areas and small towns where *A. quadrimaculatus* is the malaria vector. The first paper describes the details of construction of arc shaped and parabola shaped invert sections which can be made with unskilled or semi skilled labour and at little material cost. The second paper

describes very ingenious slab and joint designs. The slabs can be cast on the job—their use reduces the cost of ditch lining. Constructional details are clearly and fully described in both papers and the cost of construction in the U.S.A. is given in both cases.

Norman White

LEGWEN (W. A.) & HOWARD (R. S.) Jr. The Design and Application of a New Type Automatic Siphon for Malaria Control.—*Jl. National Malaria Soc.* Tallahassee Fla. 1942. Vol. 1. No. 1. pp. 83-9. With 12 figs. on 5 plates. [10 refs.]

The automatic siphon described is similar in appearance to the inverted U MacDonal siphon but modifications in design have succeeded in eliminating the preliminary loss of water before siphonage commences. In this way full advantage can be taken of very small rates of flow. The siphon may be of precast construction or it may be constructed in place on existing dams. Constructional details are clearly described.

Norman White

WENDEL (William B.) Respiratory and Carbohydrate Metabolism of Malaria Parasites (*Plasmodium knowlesi*).—*Jl. Bio. Chem.* 1943. Apr. Vol. 149. No. 1. pp. 21-34. With 6 figs. [17 refs.]

The author has made a study of the respiratory metabolism of *P. knowlesi* in Warburg manometers with special reference to the relationship between the O_2 consumption and glucose metabolism of this parasite. The observations were made on defibrinated or heparinized whole blood with the addition of various solutions. For the purpose of chemical analysis aerobic and anaerobic incubation was carried out in special Erlenmeyer flasks.

There was marked glycolysis by the parasite in the aerobic experiments and in the case of infected cells as distinct from normal cells the process was stimulated by anaerobiosis. Aerobically the initial rise in pH of the parasitized blood due to loss of CO_2 was followed by a fall in pH and then by a second slow rise. When glucose was added to the infected blood the pH of the medium fell till all the glucose was destroyed or till a pH of 5.5 was reached at which point respiration and glycolysis ceased. The production of lactic acid from glucose was established.

All concentrations of glucose added to the medium reduced the O_2 uptake of the parasites though the depressing effect of 0.15 per cent concentration was transient while the addition of serum prolonged it. Parasitized blood continued to consume O_2 in the absence of glucose. After some hours incubation when O_2 uptake was depressed the addition of Locke's solution + $NaHCO_3$ caused a rise of pH in the medium and acceleration of O_2 uptake.

The use of phosphate buffers and neutral salts had a depressive effect on parasite respiration. It was shown that the highest concentration of buffer used did not prevent a fall in the pH of the medium though respiration was greatly inhibited while the lowest concentration of buffer employed was quite ineffective in regulating pH but caused a considerable fall in O_2 uptake and decrease in cell volume. Young forms of the parasite were more readily affected than mature forms. It appears therefore that phosphate buffer is contraindicated as the

most satisfactory means of controlling the pH of the medium. Hypotonic solutions likewise affected respiration and glycolysis adversely and the parasites are sensitive to ionic as well as osmotic changes.

Evidence was obtained that respiration is only indirectly dependent upon glycolysis. When glucose or lactate was added to parasitized cells washed in Locke's solution it was found that respiration declined more rapidly after a time with the glucose substrate. About one half of the glucose destroyed accumulates as lactic acid and neither substance is completely oxidized. When unit numbers of parasites at different stages of growth were compared ring forms showed the lowest respiratory and glycolytic activity. Only rough correlation of these activities was obtained for parasites at other stages of growth.

A number of conditions favourable and unfavourable to metabolism are given as well as those without effect. Contrary to the results of COGGESHALL [this *Bulletin* 1940 Vol 37 p 670] sulphanilamide was found to be without action on parasite respiration. The author points out that the great glycolytic activity, sensitivity to changes in the composition of the medium and clumping of parasitized red cells are some of the difficulties associated with the *in vitro* study of *P. knowlesi*.

[In the original investigations in this field by CHRISTOPHERS and FULTON (this *Bulletin* 1938 Vol 35 p 709) the formation of free acid in the medium during incubation of *P. knowlesi* was not established possibly owing to the use of phosphate buffers and lactate failed to stimulate respiration significantly. In the present investigation sodium dl lactate was used, the nature of that used in the original experiments was not stated. It is surprising that in the present investigation sulphanilamide was found to have no influence on parasite respiration in view of the marked prophylactic and therapeutic action of this drug in *P. knowlesi* infections of monkeys as described by COGGESHALL (this *Bulletin* 1938 Vol 35 p 897, 1939 Vol 36 p 824 as well as of its activity *in vitro* already referred to).] J. D. Fulton

TRAGER (William). Further Studies on the Survival and Development in Vitro of a Malarial Parasite — *Jl Experim Med* 1943 May 1 Vol 77 No 5 pp 411-420

In the original paper of this series [this *Bulletin* 1942 Vol 39 p 440] the author indicated certain conditions which favoured the survival *in vitro* of *P. lophurae*. It was then shown that the parasite survived five days as judged by exflagellation of male gametocytes or six days if infectivity were taken as the criterion. The period of parasite survival has been considerably extended in the present experiments.

Infected blood was obtained by cardiac puncture of young chickens or ducks and after centrifugation the red cells were mixed with an equal volume of normal red cells from the same species of host in twice their volume of a balanced salt solution whose composition is given. The basic medium to which the infected cells were added consisted as previously of red cell extract from the appropriate host and was made up with definite quantities of serum and the balanced salt solution referred to. In some experiments the medium contained 0.1 per cent glutathione and glucose was at times replaced by glycogen. Various growth factors amongst which calcium pantothenate had a marked influence on survival were added in sterile aqueous solution to the medium while chick embryo extract was invariably added in the salt solution.

In each Erlenmeyer flask (25 ml capacity) 2 ml of medium was used and in those experiments in which the medium was changed one-third to one half of its volume was removed each time and fresh material at the correct temperature substituted. In other experiments fresh red cells of the avian host were added to the medium in the salt solution every second day. Gentle agitation of the preparation was effected by a rocking machine.

Stained films and red cell counts were made of the contents of each flask at the start of the experiment and this procedure was followed on succeeding days along with the preparation of a wet film and suitable dilutions for infectivity tests when required. The exflagellation test was used exclusively in later experiments as a criterion of survival of the parasites. The author notes that material from ducks always had more exflagellating forms than those from chicks—a result which probably depends on the host-parasite relationships.

Under these conditions *P. lophurae* was enabled to survive *in vitro* for about two weeks. In some cases there was a significant increase in male gametocytes and less often in total number of parasites during the first few days.

J. D. Fulton

TRAGER (William) The Influence of Biotin upon Susceptibility to Malaria—*Science* 1943 Feb 26 Vol 97 No 2513 pp 206-207

The author reviews previous work which shows that the severity of *Plasmodium lophurae* infections in young chickens and ducks is greatly influenced by the level of biotin in the host. Furthermore at the peak of an acute infection the biotin reaches three or four times its normal value and then returns to normal as the infection subsides. Chickens or ducks rendered biotin deficient by a two or three weeks diet of egg white [see *Bulletin of Hygiene* 1942 Vol 17 p 648] when inoculated develop infections with parasite numbers which are 50 to 100 per cent higher than those in control birds. The heavier infections persist for several days longer and more birds die. Chickens which are made only moderately deficient in biotin so that they grow well and appear normal develop heavier infections than do birds having more adequate supplies of biotin. Similar results are obtained with chickens infected with *P. gallinaceum*. Biotin-deficient ducks injected with *P. cathemerium* do not develop heavier infections than normal ducks but the infections persist for several days longer than in control ducks while several of the deficient ducks die. It has been shown that the increase in biotin during the course of an infection is not due to the new red cells formed in response to the anaemia produced by the parasites. It is not yet known whether these findings will apply to simian and human malaria but they indicate that biotin is one substance of known chemical nature which helps to determine the degree of resistance of the host to infection with malarial parasites.

C. M. Wenson

LACK (Arthur R.) Jr The Occurrence of Intravascular Agglutinations in Avian Malaria—*Science* 1943 Dec 4 Vol 96 No 2501 pp 50-521

By using the Knisely quartz rod micro-illuminator it has been possible to study the pathological changes which take place in the circulation of the wing vessels of canaries during the development of a

malarial infection There was evidence of leakage of plasma into the tissues surrounding the blood vessels progressive adherence of white blood corpuscles to the endothelium increasing agglutination of infected and then uninfected red blood corpuscles in growing clumps and increasing viscosity of the plasma The circulatory damage resulting from these changes and the developing infection led eventually to circulatory failure and death of the bird [See also this *Bulletin* 1943 Vol 40 p 584]

C M Wenyon

KIKUTH (Walter) & MUDROW (Lilly) Noch einmal Ueber die Entwicklung der Sporozoiten der Malaria Parasiten [Further Remarks on the Development of Sporozoites of Malarial Parasites] —*Zent f Bakt I Abt Orig* 1942 June 30 Vol 149 No 2 pp 98-101 [12 refs]

In this paper the authors continue the controversy they had with MISSIROLI on the subject of the early stages of development of malarial sporozoites in birds [this *Bulletin* 1942 Vol 39 p 399] They again contend with seeming justification that Missiroli's claim that the sporozoites are actually sporocysts which undergo extracellular development in the lymphatic spaces in the bird is unfounded They hold that the sporozoites after injection into the bird enter cells of the reticulo-endothelial system of the endothelium and there proceed to schizogonic development as previously described by them

C M Wenyon

BLACKWATER FEVER

BURKITT (R W) Treatment of Blackwater Fever [Correspondence] —*Brit Med J* 1943 June 12 p 737

Burkitt writes that when treating cases of blackwater fever in East Africa he was struck by the great restlessness of mind and body characteristic of that disease and to counteract this gave 8-10 grains of sodium lumioal intramuscularly having been dissatisfied with morphine In eight cases so treated in the evening all trace of blackwater had disappeared by the following morning additional treatment consisted of plenty of fluid containing sodium bicarbonate and glucose by the mouth There were no recurrences He now reports that Dr J R GREGORY of Nairobi has had a series of 30 cases all treated by intravenous injection of 15 grains of phenobarbitone and all cured at once He remarks — I have used the unscientific expression cured at once for the express purpose that it gives the picture exactly

C W

GUPTA (J C) KAHALI (B S) & GANGULY (S C) *Vitex peduncularis*—an Antibaemolytic Agent—*Indian Med Ga.* 1942 Dec Vol 77 No 12 pp 721-723

In 1921 VAUGHAN reported that aboriginal tribes of Ranchi in India were in the habit of using aqueous infusions of *Vitex peduncularis* in the treatment of malaria and blackwater fever He treated cases of these diseases himself and suggested that in vitex might be found

active principle which would provide all the powers of quinine without many of the dangers and drawbacks. Later CHOPRA, KNOWLES and GUPTA (1924) tried the drug in malaria but failed to obtain any evidence of a tivity. In this *Bulletin* 1924 Vol 21 pp 604-607. Recently MEA HART and concluded that it had a definite value. It appeared that this conclusion was based more upon clinical impressions than on actual data so that it seemed advisable to carry out a pharmacological study which the authors of the present paper have undertaken. They have found that the addition of virex the name used for the infusion of the leaves to suspensions of washed red blood corpuscles of the rabbit or its administration intramuscularly or orally increases the osmotic resistance of the cells and inhibits haemolysis by saponin acid cobra venom bile salts and saline solutions. It is assumed that virex has some action on the surface of the red blood corpuscles. It is concluded that virex might inhibit the haemolysis which occurs in blackwater fever and that as many cases of this condition follow the administration of quinine it might be advantageous to give virex before quinine to those patients suffering from malaria who from the history or appearance would seem to be liable to blackwater fever. [See also this *Bulletin* 1920 Vol 17 p 306 1925 Vol 22 p 50 1927 Vol 39 p 531] C W Henson

TRY PANOSOMIASIS

LEWIS (E 4) Tsetse Flies and Development in Kenya Colony
Part III—East Africa: *Ag. J.* 1942 Vol 8 pp 74-79
Summary taken from *Int. Bull.* 1943 June Vol 13 No 6
Signed U F RICHARDSON

This part deals with method of tsetse control and points out that traps which have been so successful against *Glossina pallidipes* in Zululand soon deteriorate under tropical conditions do not attract *G. pallidipes* when the density is low and seem to be less attractive at some seasons than at others. Local experience in Kenya shows that the creation of an artificial fly concentration by the use of scent baits etc. is necessary to prolong or increase the efficacy of the traps.

Ruthless bush clearing as a means of controlling tsetse has come to be considered too drastic and costly but it has been shown that the clearing of barrier is sufficient to prevent extension and can be used to isolate blocks of infested country in which the tsetse can be dealt with by other methods. Discriminative clearing and densification of bush can be used in some areas to render them unsuitable for tsetse but the degree of afforestation required by each species has not yet been determined and often two or more species are concerned in one area.

Game reduction appears to have given very satisfactory results in Southern Rhodesia but it is doubted whether it would be effective against species which are not so well adapted to game as is *G. morsitans*. It is suggested that a plan of approach should be adopted which should be sufficiently flexible to allow for modifications and new methods as research workers discover new means of attack.

MCDERMOTT (Walsh) WENSTER (Bruce) BAKER (Richard) LOCHART (James) & TOMPSETT (Ralph) Nutritional Degeneration of the Optic Nerve in Rats its Relation to Tryparsamide Amblyopia — *Jl Pharm & Experim Therap* 1943 Jan Vol 77 No 1 pp 24-39 With 5 figs [36 refs]

Although extensive studies have been made on the general toxicity of tryparsamide only three studies have been done on its apparently selective action on the optic nerve Recently LONGLEY and his colleagues produced blindness in monkeys by using very large doses of tryparsamide

There has been much interest lately on the nutritional aspect and certain observations that have been made have a bearing on the problem of tryparsamide amblyopia Most of the clinical reports of disease of the optic nerve associated with abnormal nutritional states deal with supposed deficiency of the B group of vitamin either alone or combined with deficiency in vitamin A while most animal experiments have been made with vitamin A deficiency The relationship of nutrition to toxic amblyopia has been investigated both clinically and experimentally It has been shown that large amounts of the vitamin B complex will cure amblyopia caused by alcohol or tobacco even during the continued consumption of large amounts of both Contrary results have been obtained by different workers in treating tryparsamide amblyopia with thiamin chloride

IMACHI and MARUO found that certain chemical poisons and bacterial toxins caused damage to the optic nerve in rats and that it was most severe in those which were fed on a diet deficient in vitamin A

From a review of the experimental work the authors of this article conclude that the proper utilization of at least two dietary factors is necessary for the maintenance of the integrity of the nervous system in animals i.e. vitamin A and some part of the vitamin B complex which is not thiamin riboflavin or nicotinic acid On account of the apparent importance of vitamin nutrition in disease of the optic nerve and in the prevention of nerve damage due to poisons they decided to make an experimental study of tryparsamide from this standpoint

Part I Vitamin B complex—Eleven groups of five young rats were given a basic synthetic diet completely lacking in the vitamin B complex This was supplemented in various groups by crystalline vitamins desiccated liver or irradiated brewer's yeast The control diet was the basic diet plus 10 per cent of powdered yeast Tryparsamide was given intravenously to six of the groups in doses of 0.1 gm per kgm body weight weekly for 10 weeks and the rats were then killed and transverse sections of the optic nerve examined

Results—Degeneration of the optic nerve developed in those rats which were fed on the basic diet without supplements whether they received tryparsamide or not but it was more marked in the former group None of the other groups showed optic nerve degeneration and no obvious evidence of blindness was noted Rats which had received tryparsamide during a period of clinical vitamin B deficiency but which had been cured subsequently of the deficiency by supplemented yeast showed no evidence of optic nerve degeneration seven weeks later although the administration of tryparsamide had been continued

It would seem that the substance in yeast responsible for the preservation of the nerve is one (or some) of the already isolated members of

sign swollen left eyelids oedema and a small haemorrhagic spot The pre auricular gland was enlarged and also slightly the cervical glands the pulse was rapid 110 per minute The trypanosome was seen in a thick drop preparation of the blood and animal inoculation proved positive Bayer 7602 (Ac) was given according to the routine recommended by Professor Mazza

Triatoma infestans caught in the child's residence were examined and one of five was found infected The course of the illness is not stated beyond the remark that the oedema of the lids subsided slowly in course of time Incidentally the serum was positive with both the Wassermann and the Kahn tests

H Harold Scott

DEVISON (Nadene) Immunologic Studies on Experimental *Trypanosoma cruzi* Infections 1 Lysis in Blood of Infected Rats—*Proc Soc Experim Biol & Med* 1943 Jan Vol 52 No 1 pp 26-27

The serum of rats which have recovered from *Trypanosoma cruzi* infection will produce lysis of the culture forms of this trypanosome in a mean time of 61.3 minutes The serum from animals which had had the reticulo endothelial system blocked with trypan blue before being infected did not lyse the culture forms till a mean time of 88 minutes had elapsed The serum of uninfected animals which had been blocked produced lysis in 153.6 minutes When the various sera had been inactivated before testing it was found that the organisms were immobilized but not lysed

In these tests the serum was diluted 1:1 If diluted 1:10 there was no lysis up to a period of 7 hours in any class of test In a series of tests with culture forms of *T. lewisi* and *Leishmania tropica* there was no lysis but motility was rapidly impaired

C M Wenvon

SENEAJI (Harry A) Immunologic Studies in Experimental *Trypanosoma cruzi* Infections 2 Slide Agglutination and Intradermal Tests—*Proc Soc Experim Biol & Med* 1943 Jan Vol 52 No 1 pp 56-59

The author has immunized rabbits against *Trypanosoma cruzi* infection by injection of killed culture forms followed by injections of living trypanosomes The serum of such immunized rabbits was collected and tested for agglutinins and lysins against H and O antigens The former was prepared by the addition of 0.3 per cent formalin to a saline suspension of culture forms and the latter by the suspension of culture forms in 90 per cent alcohol Agglutination tests were carried out in tubes with various dilutions of the serum of the immunized rabbits and the H and O antigens No differences were noted between the two readings Slide agglutination tests were carried out with an antigen prepared by emulsifying flagellates from cultures of an armadillo strain which was very smooth in salt solution containing 0.5 per cent phenol Agglutination which was very marked in low dilutions of serum was complete in 3 to 5 minutes The intradermal injection of cultures into the skin of immunized rabbits produced after 12 hours a red papule which increased in size to reach its maximum in 24 hours Immune serum in a dilution of 1:100 lysed the culture forms in two hours

[September 1943]

As a control to the above reaction 100 Wassermann sera were used. They were uniformly negative. The author considers that the slide agglutination test affords a simple method for the diagnosis of experimental trypanosomiasis in animals.

C. M. Henry

Dr. Gustavo LESSA referring to his paper on the epidemiology of Chagas disease in this Bulletin 1941 Vol 21 p 237 has written to say that the arguments advanced at that time to support the theory that there was an aetiological connexion between goitre and Chagas disease were not convincing to him but on the contrary that he tried to show their weakness. He adds that the essential purpose of that paper was to give the reasons for his belief in the widespread diffusion of the disease.—Ed

In the section LEISHMANIASIS below is included a series of papers dealing with the pharmacology and toxicity of certain aromatic diamines. These drugs have an interest for workers on trypanosomiasis because of their successful use in this disease.—Ed

LEISHMANIASIS

Wien (R) The Pharmacological Actions of certain Aromatic Diamines possessing Trypanocidal Activity.—*J. Trop. Med. & Parasit.* 1943 Apr 30 Vol 37 No 1 pp 1-18 With 10 figs

The compound investigated were the dihydrochloride salts of 4,4-diamidino diphenyl ether, 4,4-diamidino stilbene, 4,4-diamidino 1,3-diphenyl propane and 4,4-diamidino 1,5-diphenyl pentane. These compounds, which were introduced by the work of FORKE, EWING and their collaborators are important for their therapeutic action in trypanosomiasis, leishmaniasis and babesiasis. Toxicity experiments with mice giving a single dose intravenously, was found that the LD₅₀ (dose causing 50 per cent mortality) was 0.050 mgm per gm for the ether derivative, 0.031 mgm per gm for the stilbene derivative, 0.042 mgm for the propane derivative and 0.023 mgm per gm for the pentane derivative. When the drugs were given subcutaneously the LD₅₀ was somewhat higher. The symptoms consisted of general depression of the central nervous system and death resulted from respiratory failure. When repeated sublethal doses were given to young rats symptoms suggestive of cumulative poisoning developed.

When examined by standard pharmacological methods the compounds were found to have a depressant action on the circulatory system, which was only partially antagonized by atropine. The fall of

blood pressure which followed intravenous injection of the compounds was prevented or much reduced by a previous injection of calcium this action seems to be similar to the action of these compounds in sensitizing frog's striated muscle to potassium ions In this respect the compounds resemble guanidine Perfusion and plethysmograph experiments in rabbits cats and dogs showed that the fall in blood pressure was due mainly to peripheral vaso dilatation The effects on the heart were small and transitory low concentrations stimulating it and high concentrations depressing it The compounds had an ergotamine like action and reduced the actions of adrenalin on the blood pressure uterus and perfused vessels of the rabbit's ear and the cat's hind limb Isolated plain muscle of the rabbit's intestine of the guinea-pig's uterus and of the cat's uterus was stimulated by high concentrations these effects were not abolished by atropine

F Hauking

WIEN (R) FREEMAN (W) & SCOTCHER (N M) The Metabolic Effects produced by certain Aromatic Diamidines—*Ann Trop Med & Parasit* 1943 Apr 30 Vol 37 No 1 pp 19-33 [19 refs]

This paper reports further investigations on the ether stilbene propamidine and pentane aromatic diamidine compounds discussed by Wien above The compounds affected the blood sugar only in doses which approached the toxic level The main effect was to produce hyperglycaemia and the ether derivative (phenamidine) was the least active in this respect The hyperglycaemia was due partly to increased output of adrenalin from the adrenals Propamidine produced a subsequent hypoglycaemic condition Repeated high doses of the diamidine compounds produced marked depletion of liver glycogen but this may have been due in part to anorexia fatty degeneration of the liver was one of the main histological changes due to chronic poisoning

The compounds also acted on the kidneys as shown by an increase in the blood urea and non protein nitrogen figures In some instances the blood urea was raised by doses which did not influence the blood sugar By subcutaneous injection phenamidine produced less response than stilbamidine while propamidine and pentamidine produced nearly equal effects Histologically the kidneys showed cloudy swelling and fat globules in the cells of the convoluted tubules

In dogs and rabbits the serum calcium and potassium levels were both reduced by the drugs within a few hours No gross changes in the blood picture (guinea-pigs) were observed unless toxic doses were employed

F Hauking

FULTON (J D) Studies in Chemotherapy XXXIII—Toxicity and Therapeutic Action of certain Aromatic Diamidines after Exposure to Light—*Ann Trop Med & Parasit* 1943 Apr 30 Vol 37 No 1 pp 48-59 [11 refs]

A previous paper by FULTON & YORKE [this *Bulletin* 1943 Vol 40 p 23] had shown that solutions of stilbamidine (diamidino stilbene) became more toxic when exposed to sunlight but not on boiling or storing in the dark A continuation of this work shows that it is only the unsaturated compounds diamidino stilbene (RCH=CHR when

R is an amidino-benzene group) its mono methyl derivative ($\text{R CH}(\text{CH}_3) \text{CH R}$) and diamidino-tolane ($\text{R C}(\text{CH}_3) \text{CH R}$) which are affected in this way. Saturated compounds such as diamidino diphenoxypentane ($\text{pentamidine RO}(\text{CH}_2)_5\text{OR}$) or diamidino-diphenyl-ethane ($\text{R CH}(\text{CH}_2)_2 \text{CH R}$) were not affected nor was diamidino-dimethyl stilbene ($\text{R CH}(\text{CH}_3) \text{CH}(\text{CH}_3) \text{R}$). With stilbamidine the change occurred rapidly and it could be demonstrated after exposure of half an hour to winter sunlight. According to Fulton's findings and to those of BARBER, SLACK & WIEB this Bulletin 1943 Vol 40 p 376] water is added on at the unsaturated linkage according to the equation —

$$\text{R CH}(\text{CH}_2)_2 \text{CH R} + \text{H}_2\text{O} \rightarrow \text{R CHOH}(\text{CH}_2)_2 \text{CH R} \text{ (diamidino diphenylbenzyl-carbinol)}$$

As a result of these changes the solutions became much more toxic for mice while the therapeutic activity is somewhat diminished. Some of the solutions also became yellow. The practical significance of these findings is that solutions of the unsaturated amidines should be stored away from light or better still that they should be freshly prepared before use.

F. Hawkins

GOODWIN (T. W.) The Spectroscopic Examination of certain Aromatic Diamidines before and after Exposure to Light — *Ann Trop Med & Parasit* 1943 Apr 30 Vol 37 No 1 pp 59-65 With 6 figs

Using spectroscopic method Goodwin confirms the findings of FULTON (above) that stilbamidine and similar unsaturated compounds undergo photochemical alteration when exposed to light.

F. Hawkins

KIRK (R.) & SATI (Mohammed Hamad) Further Notes on some Cases of Sudan Kala Azar treated with certain Aromatic Diamidines — *Ann Trop Med & Parasit* 1943 Apr 30 Vol 37 No 1 pp 34-37

In previous papers this Bulletin 1941 Vol 38 pp 261 and 573] the authors reported that during the latter half of 1939 and the first half of 1940 they had treated a number of cases of kala azar in the Sudan with certain aromatic diamidines. The present report deals with 44 cases of which 43 were treated by the authors. There were eight deaths giving a case mortality rate of 18 per cent. Of the eight patients who died five were admitted to hospital in an extremely advanced state of illness and died after a few injections another died after a debauch. The remaining 36 were discharged from hospital as provisional cures. In all these cases the drug was administered in a solution which was freshly prepared immediately before each injection. Subsequent observations have shown that this is a factor of paramount importance in the avoidance of toxic effects. The present report describes the follow up of these cases after a period of two and a half to three years. Of the 36 patients it was not possible to trace four while three are known to have died. Of the untraced persons two were known to be alive and well 3 and 5½ months after discharge. The three deaths occurred 6, 18 and 22 months after discharge. These results of treatment and the drugs employed are given in the following table —

TABLE—Showing the final results of treatment in 43 cases of Sudan kala azar treated with three aromatic diamidines

	4 4 Diamidino stilbene	4 4 Diamidino diphenoxy propine	4 4 Diamidino diphenoxy pentane	Total
Admitted to hospital	28	2	13	43
Died in hospital	4	1	3	8
Discharged provisional cure	24	1	10	35
Died subsequently	1	0	2	3
Known to be alive and in good health 2½ years later	20	1	7	28
Could not be traced 2½ years later	3	0	1†	4

One case was seen and appeared well 5½ months after discharge as provisionally cured

† Was seen and appeared well 3 months after discharge as provisionally cured

C M Wenyon

SENEKJI (Harry A) Hematologic and Immunologic Studies on Natural and Induced Leishmaniasis in Paretics—*Amer J Trop Med* 1943 Jan Vol 23 No 1 pp 53-58

The author has made studies of blood in 22 cases of cutaneous leishmaniasis. There were no changes from the normal in any of the cases and in every instance the formol gel test was negative. In the case of four general paralytics who had previously had cutaneous leishmaniasis intravenous injections of from 9 to 100 million leptomonads from cultures of *Leishmania tropica* were made. All four developed fever (40 C) of three days duration. One subject without any previous history of leishmaniasis developed in addition to the fever hepato and spleno megaly and obstructive jaundice which lasted for 10 days. In all five cases there was improvement in the mental condition. Two patients immune to *L. tropica* were injected with large doses of culture of *L. donovani* but kala azar did not develop. Similarly no infection followed the injection of *L. brasiliensis* in a case with a previous history of oriental sore. It is suggested that injection of cultures of *L. tropica* is a promising line of treatment for general paralysis.

C M Wenyon

FEVERS OF THE TYPHUS GROUP

PLOTZ (Harry) SMADEL (Joseph E) ANDERSON (Thomas F) & CHAMBERS (Leslie A) Morphological Structure of Rickettsiae—*Jl Experim Med* 1943 Apr 1 Vol 77 No 4 pp 355-368
With 7 figs on 2 plates [10 refs]

Rickettsiae of epidemic typhus endemic typhus Rocky Mountain spotted fever and Q fever have been examined with th

help of the electron microscope (type B R C A) The organisms were obtained from yolk sac cultures and were spread on collodion film Detail of the technique will be given in another paper

The Rickettsiae of all the four diseases were strikingly similar to each other in appearance The bacillary forms are seen to have a limiting membrane enclosing a substance which is moderately opaque to electrons in these respects they resemble bacteria Like certain kind of bacteria they contain granules in the protoplasm The smaller coccoidal forms which cannot be distinguished with certainty from tissue particles by ordinary methods are found to have the same structural appearance as the bacillary forms their outline is oval They may represent the Invisible Rickettsiae whose presence has been postulated to explain the infectivity of material in which no Rickettsiae can be seen in stained films

Great variations occur in the morphology of the Rickettsiae of each of the four species but the basic structure is the same in all and it has not yet been found possible to distinguish the different species by their appearance

The structure of viruses as seen by the electron microscope does not show these variations in appearance but is relatively uniform The elementary bodies of vacinia virus are brick like in shape and most of them have five symmetrically arranged internal granules

The paper is illustrated by two plates one of which shows photomicrographs of stained smears containing Rickettsiae at a magnification of 1000 diameters the other shows electron micrographs of the four species of Rickettsiae investigated at a magnification of 16000 diameters

[The description of the morphology of various Rickettsiae as revealed by the electron microscope is of great interest It seems to confirm the view that Rickettsiae occupy a position intermediate between bacteria and filterable viruses and it lends support to the view that the Rickettsiae of the various fevers of the typhus group are closely related to each other

John D. Meade

ROBINSON (P) Typhus Fever in Addis Ababa—*J. Trop. Med. & Parasit.* 1943 Apr 30 Vol 37 No 1 pp 38-41 [13 ref.]

This note is based on 400 cases of louse-borne typhus observed between May 1941 and January 1942 Tick borne and mite borne forms of typhus are not known in Addis Ababa *Proteus OVA* agglutinins have been found by the author to occur in high titres in all cases of relapsing fever

Early diagnosis of typhus is not easy because the rash could be detected in only 6 per cent of the cases Albuminuria was an almost constant feature and the blood pressure was low averaging 60 to 80 Malaria and relapsing fever coexisted in 18 and 85 per cent respectively of the cases The Weil Felix reaction is very reliable but did not become positive till the 15th day or later in about half of the cases The live vaccine prepared locally by pupils of Weil was found useful in early diagnosis dose of 1 to 10 millions of Rickettsiae caused a powerful local reaction in healthy person but in 54 cases of typhus there was no reaction even at early stage while the Weil Felix response was still negative In 70 other cases in which the Weil Felix was positive there was no reaction [No mention is made of the day-

of the disease on which the absence of reaction was observed and more information about this interesting observation would be welcome]

In a few cases after 7 to 10 days of apyrexia there was a second spell of fever during which four patients developed fatal pneumonia. Some children had no symptoms of any kind except fever lasting one or two days. In one fatal case there was no history of fever but only severe oedema of both legs. The diagnosis was made on the strength of a strongly positive Weil Felix reaction and the findings at the autopsy.

In treatment novasurol was useless sedatives were preferred. Strophanthin was of value in acute heart failure. Unconscious patients were given one half to one litre of isotonic glucose.

There was reason to believe that some of the patients had suffered from previous attacks. The mortality rate was 6 per cent. Weigl's vaccine was used with success for the protection of the medical staff.

John W. D. Megaw

ALWENS (Walter) *Klinik des Fleckfiebers* (Frankfurt a M. Medizinische Gesellschaft 30 VI 1942) [*Clinical Aspects of Typhus Fever*].—*Deut Med Woch* 1943 Mar 12 Vol 69 No 10 pp 239-240

This is a report of an address given at a meeting of the Medical Society of Frankfurt on Main in June 1942. It contains little that is new but is of interest as a summary of the experiences of German medical workers in the winter of 1941-42.

The account of the symptoms is on the usual lines but it is stated that absence of the rash is by no means always associated with short or mild attacks. Apart from the manifestations due to the formation of nodules in the blood vessels toxins play an important part in causing early disturbances of the nervous system and convalescent serum given twice daily is often helpful in combating these. Loss of hair from the back of the head and parts of the legs was of frequent occurrence. Apart from low blood pressure there may be various special lesions of the cardiac muscle and nerves which can be detected by the electrocardiograph. The practical value of the Weil Felix reaction is undoubted in spite of occasional failures. A positive Wassermann reaction may occur up to the sixth week. In the author's experience this happened in 13 per cent of the cases.

Protective inoculation is of great value. This is shown by the mildness of the attacks in persons of 50 years and over who apart from inoculation would have little chance of survival.

The author like most German physicians is a firm believer in the value of cardiac tonics. He advocates intravenous injections of strophanthin in doses up to one milligramme daily. Intravenous transfusions of glucose or normal saline solutions are recommended. These are given twice daily. Among the numerous drugs mentioned with approval are camphor and caffeine. Sulphonamides are said to be useless except in preventing bronchopneumonia. Cold bath treatment as for typhoid fever is useful when the temperature is high. For circulatory collapse the hot bath treatment recommended by LAMPERT is advised. Vitamins B and C should be given. Open air treatment is of value when practicable. In the early stages doses of 100 cc of convalescent serum repeated when required are said to shorten the

febrile period and improve the general condition of the patients. The author advocates the establishment of an organized system for collection of convalescent serum.

SUPPLE (K) & FISCHER (H). *Erfahrungen ueber die Weil Felix Reaktion*. *Experiences with the Weil Felix Reaction*. [Arch Hyg Bakt 1943 Vol 129 No 1/6 pp 158-166]

The observations deal with cases of typhus of average severity (mortality rate of less than 10 per cent). The bacterial suspensions were made mostly from the dry diagnostic strain (Cracon) which was very satisfactory and convenient.

Contrary to the usual statements the authors found that reactions which appeared late often rose to high titres. In one case a reaction thirteen days later. The highest titre was reached before the end of the fever in 59 per cent on the last day of the fever in 11.4 per cent and after the end of the fever in 29.6 per cent of the cases.

Leaving out of account titres below 1:100, 76 per cent of the cases had titres rising to maxima of 1:1600 to 1:6400, only 2.3 per cent were as low as 1:100 and 5 per cent reached 1:25600.

Usually the titre fell to 1:50 or less four to six weeks after the onset though occasionally titres of 1:3200 or more were observed eight to nine weeks after the onset.

No association was found between the severity of the attacks and the height or rapidity of rise of the titre.

Negative reaction and weak positive of 1:50 or under were seen in only 0.8 per cent. Reactions of 1:100 are suggestive of typhus but even those of 1:100 are not absolutely diagnostic. Titres of 1:400 were never seen in diseases other than typhus.

Rickettsial agglutinations were positive in several cases in which the Weil Felix reaction was negative or weakly positive. One patient whose Weil Felix was negative had a positive Rickettsial reaction of 1:12600 and three whose Weil Felix titre was 1:50 reacted to Rickettsiae at 1:160.

In trench fever the Weil Felix reaction was sometimes weakly or moderately positive in two cases the titre was 1:50 in five 1:100 and in one 1:400. In the last the Rickettsial titre was 1:160. Positive reactions were observed in ten cases which were not typhus.

In half of the cases of typhus the titre rose to 1:400 or over between the third and eighth days and often the reaction gave the first indication of the correct diagnosis.

Dealing only with cases in which the titre was 1:400 or over, this titre was reached on the third day in 4.5 per cent on the fourth day in 5 per cent on the fifth day in 5.5 per cent on the sixth day in 13 per cent on the seventh day in 15 per cent on the eighth day in 14 per cent from the ninth to the thirteenth day in 43 per cent.

The reaction was tested in a group of persons recently inoculated with an unspecified vaccine against typhus fever about half of these had positive Weil Felix reactions in titres of 1:50 to 1:200 a fortnight or three weeks after inoculation but the reaction soon became negative. A number of cases of typhus had been wrongly diagnosed as typhoid on the strength of Widal reactions in titres which were sometimes as

high as 1-800 or over these were all in persons who had been inoculated against typhoid fever

Patients who were attacked with typhus after anti typhus inoculation usually reacted to the Weil Felix test in lower titres than uninoculated patients

John W D Megaw

WARNECKE (Bernd) Unspezifische Luesreaktionen bei Fleckfieber [Non Specific Luetic Reactions in Typhus Fever]—*Arch f Hyg u Bakt* 1943 Vol 129 No 1/6 pp 167-173

Reports of the occurrence of Wassermann reactions in typhus fever are scanty and conflicting Some of them are of little value because the sera had not been inactivated before being tested

The authors carried out the Wassermann Kahn and Meinicke (MKR II) tests at intervals of four days during the febrile and convalescent periods in an unspecified number of cases of typhus fever

The reactions to all three tests were negative in 83.4 per cent and positive to one or more of them in 16.6 per cent The reactions were never positive before the ninth day and were most frequently observed shortly before the end of the fever or early in convalescence and remained positive only for a short time The results with the three tests were inconsistent it was exceptional to get positive reactions to all three tests at the same time the Kahn reaction was more often positive than the other two

Delayed non specific reactions were sometimes observed the most extreme cases of these were a reaction to the Kahn test between the 11th and 45th days of convalescence and one to the Meinicke test between the 39th and 51st days The reactions on the whole were either weakly or moderately positive and persistent luetic reactions occurred only in cases of known or strongly suspected syphilis

Healthy persons who had been inoculated with Weigl's vaccine never gave positive reactions to any of the tests

The pallida reaction of Gaechtgen was negative in all the cases in which it was carried out

John W D Megaw

MEYER (Richard) Ueber das Verhalten von Citochol und Meinicke-Klarungsreaktion beim Fleckfieber [The Citochol and Meinicke Reactions in Typhus Fever]—*Ztschr f Immunitätsf u Experim Therap* 1943 Feb 12 Vol 102 No 6 pp 459-466

These tests were made on 712 samples of sera in which the Weil Felix titres were 1-100 and over Doubtful (+ to ++) and definitely positive (+++ to ++++) reactions occurred in 26.3 per cent of the cases with the Citochol test and in 10.5 per cent with the Meinicke test Simultaneous reactions to both tests occurred in only 4.5 per cent of the cases and the reactions were never definitely positive to both tests at the same time Taking into account only the definitely positive reactions these occurred to one or other of the tests in 2.0 per cent of the cases and only for short periods of time

There was no association between the occurrence or strength of the reactions and the titres of the Weil Felix responses negative doubtful and definitely positive reactions were about equally distributed between cases with low and those with high Weil Felix titres

The patients were kept under observation for four weeks only positive reactions were found to occur in some cases up to the end

of this period. In soldier who had been living for long periods in areas of typhus endemicity doubtful reactions were proportionally much more frequent than in those who had recently come from Germany but factors other than typhus fever may be concerned. For example two cases of malaria were wrongly diagnosed as typhus fever. In one of these the Weil Felix titre was 1-100 and there was a doubtful (+) Minicke reaction. In the other the Weil Felix titre was 1-100 the citochol reaction was strongly positive (++++) and the Minicke reaction doubtful (-+).

John W D Mcard

LEPPING (Norman H) & DYER (R E) Apparent Recent Extension of Typhus in the United States—1 of J T p W d 1943 Jan Vol 23 No 1 pp 37-42 18 ref

The geographical distribution of endemic typhus [flea borne] in the U.S.A. is discussed with reference to reports received up to January 1943. Georgia is the chief area of endemicity with about 1000 cases yearly. Alabama Mississippi South Carolina Louisiana and Texas taken together have about the same number. Cases are also reported every year from Boston New York Baltimore Norfolk Wilmington Charleston and Savannah all on the east coast. Recently cases have occurred in Tennessee and California. The disease is mostly urban but increasing numbers of cases are being reported from rural areas in the south-eastern States. Although the disease appears to be spreading it is still confined in the main to the south-eastern and southern States.

The authors now report isolated cases from Richmond Washington St Louis Cincinnati and Cleveland these are regarded as being well authenticated though the isolation of Rickettsiae from rat flea in the neighbourhood has been carried out in only one of the cases. The patient from St Louis was a Russian who had immigrated 36 years previously and it is stated that four cases of suspected typhus reported from that city in 1934 were also in Russians and that no further cases had been reported till the one now described. [The possibility that these may have been cases of Brill's disease is not discussed.] The tropical rat flea *Xopylla cl op s* has been found on rats in Iowa and several other mid western States. Physicians are advised to be on the look out for the disease because it may be more widely distributed than is at present expected.

John W D Mcard

BRIGHAM (G D) & PUGH (Ed a G) A Strain of Endemic Typhus Fever Virus Isolated from House Mice (W J J) — Vol 53 No 4 pp 130-136 Publ H H R p 1943 Ja

SCHNEIDER (I Mark) Histologic Observations on the Changes in the Brain in Rocky Mountain Spotted Fever—1 of Pathol 1943 Ap Vol 35 No 4 pp 583-589 With 2 figs [14 ref]

A woman aged 67 years died 10 days after the onset of a fever in which there was a generalized macular haemorrhagic rash affecting the whole of the body except the face. The patient and two children were attacked by fever about a fortnight after returning from a visit to Kentucky. No mention is made of a bite by a tick and the description of the agglutination reaction is in the words "The Weil Felix reaction in the blood was positive".

Petechial haemorrhages were found in the skin liver kidneys and the mucosa of the caecum. Histological examination of the brain showed miliary granulomata widely but irregularly diffused and associated with changes in the capillary vessels. The granulomata consisted of compact accumulations of large irregular polygonal or oblong mononuclear cells of varying size the centrally situated cells were degenerated. In the centre of each granuloma there was usually a capillary whose endothelial cells showed only hyperplasia the cell elements appeared to have been derived from the adventitial cells of the capillary. These cells had proliferated and invaded the surrounding nerve structures.

The final stage of the process was the necrosis of the cells and the disorganization of the capillaries. there was also degeneration of the ganglion cells in the immediate neighbourhood of the granulomata and a slight degree of proliferation of the microglia cells.

The condition was regarded as one of peri capillary cell proliferation rather than of endothelial proliferation.

Good photomicrographs illustrate the article.

[No doubts are expressed about the accuracy of the diagnosis though the evidence on which it was based is not fully stated. The description of the lesions agrees fairly closely with that of CHIARI who was dealing with the vascular lesions of louse borne typhus except that Chiari described the small blood vessels rather than the capillaries as being affected (see this *Bulletin* 1943 Vol 40 p 444).]

John W D Megar

STEINHAUS (Edward A) & PARKER (R R) Experimental Rocky Mountain Spotted Fever. Results of Treatment with certain Drugs—*Public Health Rep* 1943 Feb 26 Vol 58 No 9 pp 351-352

The authors have tested sulphathiazole sodium sulphathiazole sulphaguanidine sulphadiazine atebirin and tyrothricin in the treatment of animals infected with the highly virulent western Montana strain of Rocky Mountain fever Rickettsia. No effects of therapeutic value could be attributed to any of these drugs in spite of the varied dosages employed.

C II

PARKER (R R) & STEINHAUS (Edward A) Rocky Mountain Spotted Fever. Duration of Potency of Tick Tissue Vaccine—*Public Health Rep* 1943 Feb 5 Vol 58 No 6 pp 230-232

Tests were carried out on three samples of the Spencer Parker type of Rocky Mountain spotted fever vaccine prepared from the tissues of infected ticks. These had been stored for 12 to 14 years at a temperature range of 34 to 40 F and all three were found to have retained their full protective value.

The tests were of the standard type already used for nearly 10 000 lots of vaccine. Six guineapigs were used for each sample each was given 10 cc of vaccine subcutaneously and 12 days later was inoculated by the intraperitoneal route with 10 cc citrated heart blood taken on the third day of fever from a guineapig infected with a highly virulent strain of Rocky Mountain fever. This dose on the average represents 500 infecting doses. The resulting protection was

at least equal to that obtained 12 to 14 years previously with the same lots of vaccine. Only three of the 18 guinea-pigs used gave febrile reactions and these lasted only for a day or two.

John W. D. Mead

WESTPHAL (Karl) Ueber eine eigenartige fieberhafte Erkrankung in der Ukraine [A Peculiar Fever in Ukraine]—*Deut. Med. Woch.* 1943 Feb 5 Vol 69 No 5 pp 97-100 With 3 figs

Many cases of a problem fever were seen in Eastern Ukraine from January to July [? 1942]. The onset was like that of mild typhus with chill and severe headache but without pronounced psychic disturbance. Pains in the limbs and back were not severe. The spleen was enlarged in 90 per cent of the cases. There was relative bradycardia. A rash was seen in 70 per cent of the cases at the beginning of the fever. It was macular very slightly papular and was chiefly on the upper part of the trunk sometimes extending to the arms nearer to the face. It lasted only one or two days as a rule except occasionally it persisted for three or four days. The fever was continued with morning remissions and the temperature fell gradually towards the end of the attack which lasted usually for six to ten days but occasionally for three to five only.

There was no leucocytosis; the tendency was rather towards leucopenia. The diazo reaction was positive. Asthenia persisted for two or three weeks after the end of the attack.

Five doctors and three sanitary officers were attacked but there were no special epidemiological conditions. Lice, fleas, bugs and rats were not specially plentiful. The affected troop had been living in primitive Russian huts. The disease was widespread in the Ukraine and the name Ukrainian fever is suggested.

The Weil-Felix reaction tested on two to four occasions in each case was often negative but more often was positive in titres of 1-50 to 1-100 seldom of 1-200 and never in higher titres. In one case an attack of verified typhus occurred about a month after recovery from the fever. The Widal reaction was negative or weakly positive and blood cultures were negative.

The fever differed from the recognized types of trench fever in the absence of shin bone pains, in the occurrence of splenic enlargement together with a rash at the onset and in the absence of prolonged attacks. The seasonal distribution also did not correspond with that of trench fever which was common in the affected region. The possibility of its being a hitherto unrecognized type of trench fever is not excluded.

[The reviewer is inclined to think that the disease may turn out to be caused by Rickettsiae of the trench fever type. Trench fever is a protean disease and may be a group of fevers rather than a single clinical entity.]

John W. D. Mead

YELLOW FEVER

HARGETT (M. V.) BURRUSS (H. W.) & DONOVAN (Anthony) Aqueous Base Yellow Fever Vaccine—*Public Health Rep.* 1943 Mar 26 Vol 58 No 13 pp 503-512 [28 refs.]

Since 1936 a number of reports have been published on immunization against yellow fever by 17D vaccine prepared from an extract of infected

chick embryos in non immune human serum [see this *Bulletin* 1937 Vol 34 p 691 1939 Vol 36 p 648 1941 Vol 38 p 70] After a considerable experience with this vaccine it became evident that the use of human serum as a component of the vaccine gave rise to a definite risk of delayed hepatitis. The Laboratory of the Yellow Fever Service in Brazil therefore began in December 1940 to eliminate human serum completely in the preparation of the vaccine using the infected chick embryo extract alone [see this *Bulletin* 1943 Vol 40 pp 41-44]. The serum base vaccine continued to be generally employed while studies on the aqueous base product were under way.

The United States Public Health Service began the production of yellow fever vaccine in its Rocky Mountain Laboratory at Hamilton Montana in February 1941. A field study on the comparative behaviour of serum base and aqueous base 17D vaccine was then undertaken at Oroya Peru and in Montana on small groups of people. The results of these studies showed both types of vaccine to be equally effective. The outbreak of jaundice among American troops following the use of serum base vaccine precipitated a demand for serum free vaccine so the large scale production of aqueous base vaccine was started early in 1942 and at the time this report was written over 600 000 doses had been released for human use.

The fundamental techniques for the preparation of the aqueous base vaccine are the same as previously described [see this *Bulletin* 1939 Vol 36 pp 648-649]. The details of the method now recommended by the authors are as follows. Fertile hen's eggs are incubated as for hatching for seven days. Those eggs showing viable embryos are then each inoculated with 0.05 ml of 227th-230th passage 17D virus via a small hole drilled through the shell. Egg passage rather than tissue-culture propagated virus is employed. After sealing the inoculation holes with hot wax the eggs are returned to incubation as before for a further 90-96 hours. The eggs are then opened and the living embryos are triturated in a homogenizer. For each three grammes of embryo there is added 1.0 ml of distilled water. The finely divided tissue extract is centrifuged for 30 minutes at 3 500 r.p.m. and the supernatant liquid is drawn off. Specimens are taken for sterility tests and for determination of virus concentration in mice. The remainder of the extract is put into a one litre pyrex bottle and frozen in a thin shell by rotating in an alcohol dry ice mixture. The frozen extract is then kept at minus 60 to minus 78 C pending the results of the sterility and virus tests. If the tests are satisfactory the extracts are melted and distributed in quantities of 1.0 and 5.0 ml into ampoules.

The ampoules of vaccine are then dried under vacuum from the frozen state employing a lyophile type desiccator. The desiccation process lasts 21 hours. The desiccation system is then filled with dry nitrogen and the ampoules promptly sealed. The ampoules are labelled packed in boxes and stored at a temperature of minus 16 to minus 30 C. Refrigeration during shipment is maintained by packing the vaccine in carbon dioxide ice in a glass vacuum flask. It is recommended that the vaccine be kept at a below freezing temperature until actual time of use. On removal from refrigeration it is rehydrated to original volume with physiological salt solution and is then diluted 1:10 with additional saline. Each recipient is given 0.5 ml subcutaneously. The vaccine must be used within one hour following

rehydration No unfavourable reactions have been reported among the large series of people who have received vaccine prepared by the author's

- To be accepted for human use a batch of vaccine must conform to the following requirements —
- 1 Sterility cultures must show no growth
 - 2 None of a series of three guinea pigs inoculated intraperitoneally may show illness or a temperature of more than 39.7 C during the two weeks immediately following injection
 - 3 A minimum of 66 000 minimum lethal mouse doses of virus per millilitre must be present
 - 4 The test monkey inoculated intracerebrally must show circulating virus and a reversal of protection test i.e. the preinoculation serum specimen must show virus neutralizing bodies absent and the post vaccination specimen show them present The animal must recover from any illness incurred without signs of paralysis having developed at any time The vaccine is discarded if the test monkey develops paralysis or dies regardless of apparent cause

H. H. Smith

LEMMERT (H. W.) Jr. Studies on Susceptibility of certain Poikilothermal Animals to Yellow Fever Virus — *Amer. J. Trop. Med.* 1943 Mar Vol 23 No 2 pp 227-230

In the course of investigations on yellow fever in the Villavicencio area of Colombia and the region around Rio de Janeiro Brazil various poikilothermal animals were collected and tested in the laboratory for their susceptibility to yellow fever virus. Among the animals studied were iguanas lizards, tortoises, boas, toads and frogs. The virus was inoculated by various routes and in varying doses. The Aibi French and four South American strains of virus were employed in the tests. Blood sera of the larger species were tested for the presence of virus on successive days after inoculation. The sera were injected intracerebrally into mice. The smaller animals were sacrificed one each day, the liver was removed aseptically and suspensions made for intracerebral inoculation into mice. To determine whether the animal was capable of responding to the test dose by producing antibodies serum specimens were obtained for the mouse protection test at intervals after the inoculation.

The author concludes that no unequivocal evidence was obtained that yellow fever virus is capable of multiplication in the animals tested. In general the animals showed a very poor antibody response after inoculation with large doses of the virus.

H. H. Smith

DENGUE AND SANDFLY FEVER

HALLMANN Bertra, zum Pappataciefieber 1941 auf der Balkanhalbinsel [Sandfly Fever in the Balkan Peninsula in 1941] — *D. t. Trop. Z. ch.* 1943 Feb 1 Vol 47 No 3 pp 64-68 With 6 charts

An outbreak of a mild type of sandfly fever occurred among the troops stationed in the islands and mainland of the Athens region. It lasted from June to September but most of the cases were seen in July and

August in these two months 20 per cent of the troops in the area were attacked. Other cases must have occurred in men stationed in outlying posts. The report deals with 86 cases treated in hospital.

In 93 per cent of the cases the fever lasted two or three days in the rest it lasted four or five days.

The axillary temperature seldom exceeded 38 to 39 C. In three cases it was more than 40 C. There was conjunctival injection in 35 per cent of the patients, the face was flushed. Gastro intestinal disturbances occurred in 10 per cent during the febrile period. In 82 per cent there was headache localized in the orbital, frontal and temporal regions. There was no pronounced bradycardia. There were no complications but neuralgic pains sometimes persisted for a few days after the fall of the temperature.

Malaria, dysentery and influenza were the conditions calling for differential diagnosis. Stress is laid on the need for examining thick blood films to exclude malaria.

Aspirin in daily doses of 1.5 to 3 grammes was given to most of the patients. This had no effect on the duration of the fever but gave relief to the pains. The period of incapacitation for duty was only four or five days.

John W. D. Megaw

PLAGUE

DOUGLAS (J. R.) & WHEELER (C. M.) *Sylvatic Plague Studies. II. The Fate of Pasteurella pestis in the Flea*—*Jl Infect Dis* 1943 Jan-Feb Vol 72 No 1 pp 18-30. With 14 figs & 1 chart [12 refs.]

Detailed work of a strict laboratory type is being carried on by the authors and this article is packed with information of practical importance. Two fleas have been used in comparative experiments, one the accredited chief vector of human plague, the rat flea *Xenopsylla cheopis* and the other the test flea common on California ground squirrels *Dipodomys montanus*. A very full account of methods is given. The number of fleas used is considerable and photomicrographs of sections of infected and non infected fleas add much to the interest of the investigation. This research once more emphasizes that the transmission of *Past. pestis* by fleas is absolutely dependent on the multiplication of the bacilli in the alimentary tract of the insect. It has not been confirmed, however, that the faecal droplets of infected fleas consistently contain large numbers of plague bacilli. Indeed this shedding of bacilli is so irregular that it seems unlikely that faecal matter of the flea is much concerned in the infection of the mammalian host.

In this research white mice were used. It only required an intraperitoneal inoculation in mice of some 20,000 plague bacilli to give rise to a maximal bacteraemia (10 million per cmm of blood) within 48 hours. By the method of the authors for calculating the capacity of the stomach of *Dipodomys montanus* and *X. cheopis* from the number of organisms ingested in the blood meal, a figure (0.03 cmm) was obtained which is much smaller than the average (0.5 cmm) of the Indian Plague Commission.

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

Dr ANTONI (Joseph S) Further Observations on Amebic and Bacillary Colitis in the New Orleans Area — *Amer J Trop Med* 1943 Mar Vol 23 No 2 pp 237-242

This is a contribution on much the same lines as the one recently reviewed in this *Bulletin* 1943 Vol 40 p 53

The present study deals with patients observed since April 1941 and who were investigated for chronic colonic symptoms. 236 patients were seen and fell into two groups. Subjects in the first group were available for thorough examination and could be followed up for prolonged periods. Investigation consisted of microscopic examination of three normally passed stools over a period of one week as well as of specimens passed after taking a purgative or an enema and sigmoidoscopic examinations. During the latter material from suspected areas was aspirated, examined and cultured for dysenteric organisms. In the second group were included hospitalized patients referred to the Department of Tropical Medicine for sigmoidoscopy. No faecal specimens were therefore examined prior to sigmoidoscopy. The purgative consisted of sodium sulphate and the follow up continued for limited periods only. Part of the aspirated material was cultured for dysentery bacilli.

There were 36 patients positive for *Entamoeba histolytica*. The lesions were classified as one plus or two plus depending on whether fewer or more than thirty typical pinpoint amoebic lesions with characteristic exudate and normal intervening mucosa were present. It became obvious from 12 cases with absence of rectal lesions that caecal amoebiasis can rarely be diagnosed by examination of aspirated material; it therefore depends on recovery of the organism from normally passed or purgation stools.

In one group of 173 patients in whom one stool examination was performed 39 harboured *E. histolytica*, an incidence of 22 per cent. This group represented individuals in whom a low grade and mildly debilitating infection was predominant. In three tumours or amoebomata which disappeared after anti amoebic therapy were demonstrated.

In 7 per cent mixed infections with Shiga organisms were detected.

Five strictures typical of lymphogranuloma inguinale were found to coexist and there was a case of sprue with superadded amoebiasis.

The term *Shigella colitis* is suggested for cases in which the colitis syndrome is associated with *Shigella* organisms. The bowel showed a dark red granular appearance with secondary infection regarded by many as an early stage of non specific colitis.

Other diseases were revealed such as carcinoma and undulant fever. Within the past few years it has become apparent that both *Brucella melitensis* and *Br. abortus* may produce a colitis.

Thirty four cases of non dysenteric amoebiasis and 12 of amoebic dysentery have been treated with Diodoquin (Searle). The course of treatment was three tablets (32 grains) three times daily to adults for 20 days. Four children (aged 6-11) received two thirds of this dosage. A minimum of three negative stool specimens at least two weeks after completion of treatment and whenever possible spread over a period of one week was taken as a criterion of cure.

[September 1943]

Examination included the direct faecal film and the zinc concentration technique. In 44 out of 46 cases the drug caused the disappearance of *E. histolytica*. The drug failed in two cases but in one was later successful.

MEIRO (Luis) Die Hausfliege (*Musca domestica*) als Uebertrager von *F. histolytica* und anderen Darmprotozoen [The House-Fly as Carrier of *F. histolytica* and other Intestinal Protozoa]—*P. Maissen Bah D. Trop. Ztsch.* 1937 July 15 Vol 46 No 14 pp 361-

The carriage of intestinal protozoa by house flies has been the subject of investigation by a number of observers since WENJON and O'CONNOR first showed in 1917 that flies feeding on faecal material ingested the protozoa and subsequently passed them unaltered in their faeces. It is as evident that flies were capable of depositing their faeces on material destined for human consumption and thus passing the protozoa partly to the cysts through the intestine of the flies in a short time as five minutes afforded better opportunities of transmission than the possible adherence of infected material to the feet or proboscis where rapid drying would occur. The viability of the cysts in the caput from the flies intestine was based on the eosin test in which it was assumed that cysts staining with eosin were dead and therefore not so staining were alive. In the case of trichomonas such a test was not necessary for it was shown that the flagellates passed by the flies were still actively motile.

The author of the present paper describes further experiments which confirm the previously carried out by Wenjon and O'CONNOR. He claims however that the eosin test for viability is not reliable and that in certain observations he has shown that cysts have no affinity for eosin and others possessors no such affinity have failed to initiate cultures when inoculated into suitable media. He has shown however by inoculation of faeces of flies previously fed on cyst containing material into culture media that the cysts passed by the flies are actually alive. Such viable cysts may be passed by flies at any time between 1 minute and 24 hours after feeding. By feeding flies on medicinal charcoal or carmine it has been shown that these substances are still being passed by the flies many days later so that there is a possibility that protozoal cysts if ingested in sufficient numbers and flies on food after period much longer than 24 hours.

[Whether the author's statement regarding the eosin is correct or not the conclusions drawn regarding the carriage of intestinal protozoa by flies are the same as those previously made by other observers. It must however be impossible to state that every cyst inoculated into a culture tube has shown an affinity for eosin while it is a common experience that presumably viable cysts may fail to give rise to cultures in suitable media.]

BREA (Mario M.) & ALVAREZ (Flavio L.) & TALANA (Jorge I.) Amibiasis hepato-pulmonar. Amoebic Abscess of Lung and Liver I—*B. Inst. Cl. Q. S. Buenos Aires* 1943 Feb Vol 19 No 14 pp 107-114 With 9 figs English summary

The patient was a man 28 years of age who seven years previously had had an attack of diarrhoea probably dysenteric and had suffered

with similar symptoms at intervals since then. During the seven months before he came under the author's care he suffered from pain in the right flank and hypochondrium and in the last two months in the right side of the chest also. He had a leucocytosis of 14 600 per cmm. sputum blood tinged and chocolate coloured. Amoebae were not seen in it then but they were later. X rays showed a raising of the right side of the diaphragm signs of abscess in the liver and a shadow in the right lung. Pus drawn from the lung contained *E. histolytica*. Injection of lipiodol proved the lung lesion to be continuous with that of the liver.

The patient was given subcutaneously 0.06 gm. of emetine hydrochloride daily to a total of 0.5 gm. followed by yatren 45 pills orally in seven days and 40 drops of 1 per cent adrenalin. The result was most gratifying. Fever pain and haemoptysis disappeared in a few days. the expectoration diminished in quantity from 300 cc daily to 20 cc in 20 days the general condition and appetite improved and the patient put on weight. He left hospital 25 days after his admission. By this time blood examination revealed red corpuscles 4 400 000 haemoglobin 84 per cent white cells 8900 per cmm 77 per cent polymorphonuclears. A month after he left hospital the course of emetine injections was repeated and further observation and X ray examination showed complete restoration to health.

H. Harold Scott

MEDICAL RESEARCH COUNCIL. *Monthly Bull. Emergency Public Health Lab. Service* 1943 May Vol 2 pp 44-46 (Not for sale)—*Giardia Lamblia* Infection in Young Children [Summary appears also in *Bulletin of Hygiene*]

An examination of young children in residential nurseries in Northamptonshire has shown that *Giardia* infection is widespread. Of 41 examined during epidemics of gastroenteritis 24 or 58.5 per cent were infected while of 118 healthy children only 36 or 30.5 per cent were infected. Of 27 children suffering from diarrhoea 21 or 78 per cent harboured the flagellate. Of 130 who had normal stools 30 per cent were infected. Other protozoa were also encountered. Thus in a series of 159 there were 60 cases of *Giardia intestinalis* infection 10 cases of *Chilomastix mesnili* infection 6 cases with *Entamoeba coli* and 3 cases with *Iodamoeba butschlii*. It is noted that though *Giardia intestinalis* is the commonest intestinal protozoon found the observations throw little light on the problem of the rôle of this flagellate in causing gastroenteritis since an organism whose natural habitat is the upper part of the small intestine might be expected to appear in large numbers in the stools during attacks of diarrhoea. It is suggested that useful information might be obtained by studying the effect of mepacrine which generally eradicates the infection in a few days. As a guide to dosage that recommended by the League of Nations Commission as suitable for malaria is given viz.—

Age up to 5 years 0.1 gm. daily

Age 5-12 years 0.2 gm. daily

Age 12 years and over 0.3 gm. daily

The proviso is made that infants of 1 year and under are not treated

C. M. Wenzon

ROJER (P H) & DRELER (M) Zur Frage der Lambliasis [On
Lambliasis Infections —*Schweizer Med Woch* 1943 Feb 13
Vol 3 No 7 pp 209-21 With 4 fig [Numerous refs]

This paper is a lengthy review of the literature on human lamblia infection together with a description of 20 cases in adult which came under the author's notice. The numerous symptoms local and constitutional which various authors have attributed to this infection are summarized without any attempt being made at critical analysis. It is assumed that an enteric syndrome exists which is due to the invasion of the biliary passages by the flagellate (though in fact all reliable evidence indicates that such invasion rarely if ever occurs). It is noted that the new remedies—atebrin, quinacrin, acranil—will easily eradicate the infection thus affording opportunity of separating symptoms due to the flagellate from those due to other causes. The authors maintain that lamblia infection is a venereal symptomless should be treated at any time acute symptoms may supervene. The paper though a long one gives no indication of immaturity. C M Henne

HUČEK (Jamil) & JIKOV (Otto) Zur Kenntnis der menschlichen Darmparasiten im Mahren. Human Intestinal Protozoa in the Mahren District —*Arch Hyg u Bakt* 1942 Vol 128 No 3 pp 123-130 Numerous refs

During the three year 1939-1941 the authors examined 623 patients in the Batá Hospital in Zlín in the Mahren District of Czechoslovakia for intestinal parasites. The examinations were carried out by examining wet and stained films of fresh and concentrated material and by culture method. For protozoa 440 were examined and the following results in percentages were obtained —*E. amoeba histolytica* 1.5 small races of *E. histolytica* (*E. hartmanni*) 1.5 *E. coli* 16.8 *Iodamoeba* 1.5 *E. idoli* 2.2 *D. entamoeba* 0.2 *Trichomonas vaginalis* 0.2 *Chilomastix mesnili* 0.2 *Giardia intestinalis* 1.1 *Blas. oocystis hominis* 3.4. Parasitic worms were looked for in 623 patients with the result that *Taenia solium* was discovered in 0.45 per cent *T. saginata* in 3.5 *D. pylori* in 0.5 *ascaris lumbricoides* in 4 per cent *Entobius vermicularis* in 4 *Trichostrongylus axei* in 8.9 per cent. Mixed infections were commonly encountered. C M Henne

LEPROSY

AUSTIN (C J) Central Leper Hospital Malawi (Annual Report for 1941) —*Fiji Leislature Council Council Paper* No 25 1942 pp 8-10

In 1941 the admissions numbered 39 30 of which were neural and 24 lepromatous cases. The discharges numbered 47 and the deaths 44. Of 19 fairly advanced lepromatous cases 13 were in Indian among whom earlier detection is required if good results are to be obtained. Improved training of medical practitioners regular examinations of school-children and all contact of known cases and the follow up of

discharged patients should greatly improve the position. In both types of leprosy a considerable majority of patients are in stage 2 and well over 50 per cent are in an infective condition. This institution takes in cases from the Cook, Gilbert and other islands and it is noteworthy that by far the highest percentage of arrested cases were among the Cook Islanders. This is ascribed to the large proportion of very early cases sent by a Cook Island doctor who had been trained at the Makogai Leper Hospital. Among a total of 702 cases 111 (15.8 per cent) were classified as arrested after being clinically and bacteriologically negative for two years. 47 were discharged during the year and 45 more are waiting examination by a medical board. Moreover 154 (53.1 per cent) of 290 Lepromatous 2 cases showed improvement during the year against 70.8 per cent of 113 Neural 1 and 77.3 per cent of Neural 2. Of the 39 deaths 24 were due to leprosy (including sepsis and gangrene from trophic sore) and five were from pulmonary tuberculosis. Intramuscular injections of iodized chaulmoogra oil and intradermal injections of ethyl esters remain the routine treatment. Altogether good progress is being made at Makogai under its experienced medical superintendent.

L. Rogers

DHARMENDRA & MUKHERJI (N) Seasonal Variations in the Activity of Lesions of Neuro Macular Cases of Leprosy—*Leprosy in India* 1943 Jan Vol 15 No 1 pp 7-14

This paper records the results of an inquiry into the seasonal variations in the activity of neuro muscular leprosy lesions on the lines of that of LOWE and CHATTERJI in 1939 [this *Bulletin* 1939 Vol 36 p 1015] which it confirms. The tuberculoid type was selected in which alone such variations had been found in the earlier inquiry and included 80 cases with recent exacerbations and 21 with the recent onset of thick red lesions. Only a few could be followed up for over a year. It was found that exacerbation of the lesions occurred in 65 per cent of the cases during the four hot dry months of February to May and only 35 per cent in the remaining eight months of the year. The increased activity lasted for about six months. In the 24 bacteriologically positive cases the bacilli were found during the hot months mostly in April and May. During the phase of activity the lepromin test showed strong reactions. Of 37 cases which remained under observation for from one to three years in seven the increased activity was again observed in the second or third year but it was less marked than in the first year.

In discussing the causation of the seasonal exacerbations the authors point out that observations in other countries showed exacerbations in the spring and autumn in Russia and in the cooler months of December and January in Nigeria so climatic conditions do not explain the phenomena. Nor are they related to increased consumption of colocasia as has been suggested for more is consumed in Eastern Bengal with little leprosy and less in Western Bengal with high leprosy incidence. The causation of these seasonal variations is thus not clear.

L. Rogers

LEPROSY IN INDIA 1943 Jan Vol 15 No 1 pp 3-6 [16 refs]—Colocasia and Leprosy

Conclusions—Several years ago one worker suggested that in Africa the eating of colocasia (taro) might precipitate the appearance

of leprous lesions in a person with a latent leprous infection and might aggravate such lesions if already present. This effect was attributed to certain substances present in taro. Seasonal variations in the consumption of taro were considered to be related to seasonal variations in the manifestations of leprosy which were observed.

The evidence produced in support of the theory was very slight and no further facts in corroboration have been produced by the original workers or by any other worker.

The suspected substances are it is believed removed by the prolonged boiling usually given. Moreover seasonal variations in leprosy occur in several parts of the world independent of the consumption of colocasia.

The general opinion of experienced workers is that the theory has no sound foundation and that the consumption of colocasia as such plays no part in the causation or aggravation of leprosy.

While colocasia is a starchy root which is not of outstanding nutritive value it may form a useful supplementary article of diet. There is no valid reason why its production and consumption should not be encouraged in order to increase food supply in times and areas of food shortage.

HAYTHORNTHWAY (H. M.) Lactoflavine for Bullae and Closed Plaster for Trophic Ulcers — *Leprosy in India* 1943 Jan Vol 15 No 1 pp 20-22 With 2 figs

This note deals with two points of practical importance in the treatment of leprosy. Crops of bullae leading to the formation of painful ulcers may cause much distress. In view of lactoflavine having been recommended in the treatment of pemphigus the author has used it in 24 cases of bulla formation with success in every case. Injections of 2 cc lactoflavine (B. D. H.) four or five times in the course of a year were effective in keeping five long standing cases free from these lesions, three others cleared up after one to three injections. The condition is not associated with other signs of vitamin B deficiency.

His other point is that in the absence of hospital accommodation great relief was afforded in cases of perforating ulcers of the foot with out bone disease by a light plaster support. L. Rogers

HELMINTHIASIS

ELLIOTT (W. G. M.) Phenothiazine Treatment of Multiple Intestinal Helminthic Infestations — *Jl Roy Army Med Corps* 1943 Mar Vol 80 No 3 pp 156-159

The author who earlier successful treatment of 18 cases of dracon tiasis in West African troops by injections of an emulsion of phenothiazine have been reported [*this Bulletin* 1942 Vol 39 p 778] has now treated 26 cases of infestation with various helminths in West African troops with phenothiazine given by the mouth. None of the patients showed any clinical evidence of toxic effects (i.e. no headache, vomiting, nausea, diarrhoea, jaundice or abdominal discomfort) but the author does not say whether he made any examinations of the blood or not. Many of his patients suffered from vitamin deficiencies.

especially lack of vitamin B and many had yaws chronic malaria filariasis dracontiasis or schistosomiasis. On admission they were given a semi solid diet and the fluid intake was discouraged each day 2 ounces of glucose 2 ounces of Bemax and a teaspoonful of Marmite were given. The first evening half an ounce of sodium sulphate was given and this was repeated next morning. The first stool was sent to the laboratory and 4 gm of phenothiazine were given morning and evening for two days. On the third morning 8 gm were given. Four hours after this last dose the patients resumed a full diet. If three consecutive stools were free from parasites after this treatment the patients were discharged and asked to report for a check up a month later. If further treatment is necessary the author recommends that no more phenothiazine should be given for three weeks (apparently he means for three weeks after the first treatment). If toxic signs develop the drug should be stopped. Infants and children should be observed for a week after treatment.

Elliott concludes that this treatment eliminates *Trichuris trichiura* and *Strongyloides stercoralis* and has undoubted value for the treatment of *Ancylostoma duodenale* [contr MANSON BAHR this *Bulletin* 1942 Vol 39 p 6 who found that it had no effect on this species] and of *Taenia saginata* it has little action on *Chilomastix mesnili*.

[The results of recent trials conducted by the Agricultural Research Council shortly to be published indicate that when graded doses of 5-50 gm of phenothiazine were given to a large number of sheep only the higher doses (40-50 gm) decreased the numbers of *Strongyloides papillosus* and *Trichuris*. Statistical analysis of the results suggested that the tapeworm *Moniezia* and probably the nematode *Nematodirus* also were more numerous among lambs heavily dosed with phenothiazine. Possibly the removal of other competing species by the phenothiazine helped the survival of these two species and possibly lower doses (20-30 gm) helped the survival of *Trichuris* and *Strongyloides papillosus*. KAUZAL (*Jl Counc of Sci and Ind Res* 1941 Vol 14 p 218) found that a dose of 0.6 gm per kilo live weight had no effect on *Strongyloides papillosus* of lambs 4-5 months old and none on its egg production. Much more evidence derived from the treatment of a sufficiently large number of patients followed by careful checking of the results by approved helminthological methods is required to establish the effect of phenothiazine on the nematodes of man. For the risks associated with the administration of phenothiazine to man and animals see this *Bulletin* 1942 Vol 39 pp 861-862.]

G Lapaque

KOPPISCH (Enrique) Manson's Schistosomiasis — *Jl Amer Med Assoc* 1943 Mar 20 Vol 121 No 12 pp 936-942 With 6 figs [25 refs]

No planorbid snail in North America has yet been proved capable of acting as the intermediate host of *Schistosoma* [cf BLUM and LILGATH *this Bulletin* 1943 Vol 40 p 552] but there is no certainty that none exists until an exhaustive survey of N American snails has been made.

The geographical distribution and life history of *Schistosoma mansoni* and the prevention of the disease are briefly discussed. Most of the paper is devoted to the pathology and clinical manifestation. Controversial points such as the route taken by the metacercariae from the

of leprosy lesions in a person with a latent leprosy infection and might aggravate such lesions if already present. This effect was attributed to certain substances present in taro. Seasonal variations in the consumption of taro were considered to be related to seasonal variations in the manifestations of leprosy which were observed.

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HELMINTHIASIS

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When he was seen the patient had a painless fluctuant swelling measuring 5 by 3 cm in the upper third of the left sterno mastoid there was no enlargement of the glands no otitis externa the ear drum was normal and there was no oral trouble Operation revealed a thin walled cyst deep in the muscle of the levator scapulae which extended back to the base of the skull The pus from the cyst contained numerous eggs indistinguishable from those of *Paragonimus* they were broadly oval pale yellowish brown without segmentation of the contents and without any noticeable thickening of the shell at the pole opposite to the operculum such as is usually described in the eggs of *P. westermani* They measured after fixation in 10 per cent formal saline 62 by 40 microns The authors think that even when allowance is made for shrinkage this size is smaller than that given for the eggs of *Paragonimus* species i.e. 70-90 by 45-55 microns and they think they may possibly have observed a new species or variety occurring in West Africa [BELDING 1942 Text book of Clinical Parasitology gives 73-118 by 46-67 microns as the size of the eggs of *P. westermani*] No adult trematodes were found in the cyst but this was ruptured during the operation and was not removed complete The incomplete cyst measured 5 by 4 cm and had a wall 1 or 2 mm thick The cyst consisted of an outer zone of collagen fibres with occasional bundles of striped muscle plenty of small blood vessels scanty inflammatory cells an occasional foreign body giant cell and few eggs and an inner zone of vascular granulation tissue mixed with collagen fibres richly infiltrated with eggs and inflammatory cells eosinophils were scanty in this and also in the pus In the blood there were 8 per cent of eosinophils 61 per cent of lymphocytes and 29 per cent of polymorpho-nuclears but high lymphocyte counts are common in Nigeria The sputum taken after enforced coughing was normal The chest and alimentary canal were normal The left ear drum was normal but the hearing was considerably impaired bone conduction being greater than air conduction There was right homonymous hemianopia and impaired vision of the whole right eye Pupil reflexes fundi and cranial nerves were normal There was no nystagmus ataxia or dysdiadochokinesis but slight Rombergism to the right side The arms and legs of the right side showed diminished muscular power and there was hypotonia of the left side All the deep reflexes of the left arm were diminished and the left knee jerk was only elicited after reinforcement Ankle jerks plantar reflexes and radiology of the cranium were normal The authors suggest that the flukes caused multiple lesions of the central nervous system and also migrated into the region of the left ear

G. Lapeere

CHANDLER (Asa C.) Studies on the Nutrition of Tapeworms—*Amer J Hyg* 1943 Mar Vol 37 No 2 pp 121-130 [16 refs]

After remarking that there is no experimental verification of the common view that tapeworms depend for their food on digested or semi digested substances in the intestines of their hosts the author reviews the experimental work that has been done on the nutrition of tapeworms This indicates that starvation of the host and especially removal of carbohydrates from its food reduces the egg production and glycogen content of tapeworms in it HAGER [Iowa State College *Journal of Science* 1941 Vol 15 pp 127-153] found that elimination

of the vitamin B complex from the diet of rats infested with *Hymenolepis diminuta* caused practically complete inhibition of the egg output. Elimination of vitamin G only has the same effect but elimination of vitamin B₁ only caused no significant decrease of egg production. WARDLE [*Physiol Zool* 1934 Vol 7 p 36] GREEN and WARDLE [*Canad J Zool* 1941 Vol 19 p 240] and MAIKOV [*C Rend Acad Sci U R S S Dok* 1939 Vol 25 p 33] all kept tape worm in artificial media. WARDLE thinks that glucose is the only carbohydrate needed by tapeworms and that they synthesize it into glycogen and store it in the cell of the parenchyma that they cannot synthesize glycogen from amino acids because their respiration is not aerobic and that they may need only simple amino-acids and no fats. Chandler suspected that tapeworms get part of their food from the mucosae of their hosts because immature tapeworms even those which like *Cysticercus fasciolaris* develop some of the strobila in the bladder worm stage always take food from the host's tissues and are usually not bathed in blood or body cavity fluids but are in the liver nucle brain under serous membranes or even in a thick connective tissue capsule (hydatid). Also adult tapeworms are not always confined to the lumen of the intestine. Various species are mentioned which may be found in the bile ducts or body cavity. Further host specificity is rather marked among tapeworms which one would not expect if they did not depend partly on the host's tissues for food.

Working with *Hymenolepis diminuta* in albino rats Chandler tried the effects of elimination of proteins and vitamins from the diets of the hosts. Details of all the diets are given.

The first experiment indicated that elimination of protein from the host's diet had no evident effect on the growth or reproductive capacity of the tapeworms. Elimination of all vitamins had no effect on the growth or establishment of the tapeworms in the male rats although there was some reduction of their reproductive capacity. But there was a striking failure of the tapeworms to establish themselves in the female rats deprived of all vitamins whether or not these were given protein as well. Of the few that did establish themselves those in the rats deprived of vitamins but given protein were markedly smaller (only 50 mm long) than those in rats deprived of both protein and vitamins (745 and 767 mm long). On the other hand tapeworms in rats given vitamin but no protein were larger than those in the controls and in one female of this group tapeworms bigger than any the author had seen were found. They were also bigger in males deprived of both protein and vitamins than in the control. Experiment 2 confirmed the facts that lack of vitamins in the host diet has a marked effect on the establishment and growth of tapeworms in female but not in male rats and that most of those that did establish themselves in female rats were small.

Experiment 3 indicated that complete lack of carbohydrate from the host's diet caused marked reduction of the establishment of the tapeworms and very severe stunting of their growth. The total average length of worms per rat being reduced to one tenth of that of worms in rats on a normal diet. Reduction of carbohydrate to 5 gm a day produced a slight but significant decrease in length and width of the tapeworms. Lack of the fat soluble vitamins A, D and E had no effect whatever on the establishment of the tapeworms in the host or on their growth nor had lack of vitamin B₁. Lack of the vitamin G complex did not affect the establishment of the tapeworms but it

caused a marked stunting of their size nearly equivalent to that caused by lack of carbohydrate. This confirms HAGER's results.

The tapeworms were thus totally independent of protein in the host's diet: some of them found in rats deprived of protein were actually larger than any that the author had previously seen. It is evident that they absorbed protein directly from the intestinal mucosa of the host: this may explain the stunting effect of over-crowding which has often been reported because this would interfere with surface contact of the tapeworms with the mucosa.

The increase in size of tapeworms in rats deprived of protein only was not expected. This and also the better growth of the tapeworms in rats deprived of protein but given vitamins than in rats deprived of vitamins only may be due to failure of these rats to use some part of the vitamin G complex so that more is available for the worms. Like REID [Supp. to *Jl Parasitology* 1940 Vol 26 p 16] Chandler thus found that *H. diminuta* cannot get enough carbohydrate from the mucosa and is very sensitive even to partial restriction of it in the diet. Reid is probably right in assuming that the effect on the tapeworms of starvation of the host is due to deprivation of carbohydrate. *H. diminuta* is independent of fat soluble vitamins A, D and E and of B₁ but in female rats it is affected by lack of some part of the vitamin G complex. It may be able to get enough of the vitamin B complex from the host's mucosa because single worms in hosts deprived of protein grew to normal size.

The conclusion is thus warranted that tapeworms get the bulk of their carbohydrate from their host's intestinal contents but can absorb nitrogenous substances and probably B vitamins to a limited extent direct from the host's intestinal mucosa. If this is so the common idea that tapeworms produce their effects by robbing the host of its food and excreting toxins should be replaced by the view that the nervous symptoms, gastro-intestinal troubles, loss of weight and general weakness may be due not to the absorption of toxins but to absorption of vitamins, protein and possibly hormones and other substances from the host's intestinal mucosa. Tapeworms often produce no symptoms in well-nourished individuals and their effects vary in different individuals. Possibly *Diphyllobothrium* absorbs the intrinsic factor which converts the extrinsic factor contained in meat and yeast (which is possibly part of the vitamin G complex) into an anti-pernicious anaemia factor so that pernicious anaemia results in individuals who have not enough of either the extrinsic or intrinsic factor.

G. Lapage

MUKERJI (A. K.) & MAPLESTONE (P. A.) Preservation of Hookworm Ova in Faeces—*Indian Med Ga* 1943 Mar Vol 78 No 3 pp 136-141

The authors wished to find a preservative which would keep hookworm eggs long enough for them to be sent from distant places to a laboratory: they decided that preservation for 3 weeks would be sufficient for this purpose. Egg counts were done on faeces 3 to 4 hours after they had been passed. 4 cc samples in paper containers were then dropped into phials containing 20 cc of the preservative being tested: the phials were shaken to free the faeces from the paper containers and they were left for 3 weeks. Fecal counts were then made.

The following preservatives all proved to be unsatisfactory: anti formin made with the proprietary chlorine preparations called Chlorion and Ierchloron, Scott's anti formin, paranitrophenol, acriflavine, methylene blue, brilliant green, gentian violet, mercurochrome, cyllin, Dettol, thymol, formalin, formalin saline. While trying formalin saline it was noticed that the eggs kept well in a 1 per cent NaCl control solution. This was therefore tested but it was found that the pH fell during the 3 weeks and that if it fell more than 0.3, loss of eggs began. The less the fall of pH, the less the loss of eggs. Reduction of pH was due to fatty acid, resulting from imperfect carbohydrate digestion due to hookworm disease and to excess of fats in the diet. Buffered NaCl solutions did not maintain the pH and no better results were obtained by the use of sodium bicarbonate.

Finally it was found that dilution of the stool with the salt solution to 1 in 30 solved the difficulty. When this dilution was adopted instead of the 1 in 6 dilution used for the earlier trials, eggs were not lost and sometimes the final counts were higher than the initial ones. Longer trial showed that the eggs begin to degenerate after about 23 days in 1 per cent NaCl solution. In the field stools can be collected in 3 cc. paper containers which are dropped into sample bottles containing 87 cc. of 1 per cent salt solution, or the same amount of stools can be measured into the bottles by displacement. The bottles are well corked, the corks are tied to the necks of the bottles and these are sent to the laboratory for counting. After 3 weeks in this solution egg look quite fresh, only occasional degenerate ones being seen (only 34 out of 2820 eggs counted in 23 experiments were degenerate).

G. Lapeere

BECHMEL (A). Deux ans de lutte contre l'ankylostomiase dans les mines de l'Office Chérifien des phosphates. [Two Years of Measures against Ankylostomiasis in the Mines of the Sherifian Phosphate Service].—*Bull. Inst. Hyg. Maroc* 1941, N. S. Vol. 1, pp. 45-53.

Ankylostomiasis was first found in the phosphate mines at Irbid in 1937 in 10 European workers. The author gives figures of examinations of the workers in the mines carried out in 1938, 1940 and 1941 and concludes that ankylostomiasis had at the end of 1941 disappeared as a result of sanitary measures and treatment of infested persons. At the end of 1941 only 109 lightly infested healthy carriers were found, with less than 10 eggs per cc. of the faeces. These would be no danger to the staff of the mines and would be spontaneously cured in two or three years. Such is the normal life of ankylostomes. Examination of the miners, sanitary measures and treatment of infestations likely to menace health will however continue.

G. Lapeere

PASTERNAK (Joseph G.). Filarial Epididymofunculitis.—*Arch. Intern. Med.* 1943, Mar. Vol. 35, No. 3, pp. 414-419. With 2 figs.

The author calls particular attention to genital complications or sequelae of filarial infection because returning American troops will have disease unfamiliar to American physicians and he warns the latter so that they may be on the look out for these filarial conditions using the same words as Sir Philip Manson-Bahr does in Manson's Tropical Diseases, that patients with chronic swellings about the

spermatic cord testis scrotum and groin who have been in the tropics should always be regarded as possibly filarial [The quotation is not acknowledged by the author either by reference or even by the use of inverted commas] Readers with wide tropical experience will not entirely endorse the statement that filariasis due to *W bancrofti* is second only to malaria in prevalence

The author details two cases one in a native aged 37 from the Cape Verde Islands the other in a white seaman from Martinique with nodular lesions of the epididymis a thickened beady spermatic cord and nodules of the testis Histologically there was much fibrosis thickened capillaries lymphangiectasis and some granulomatous tissue—in brief an obliterative granulomatous endolymphangitis In the sections remains may be seen of dead filariae partly calcified Clinically symptoms may be few—fever pain and chills in the earlier stages later swelling and hardness of the spermatic cord and swollen tender epididymis—all these in the acute or subacute stages in the chronic stage merely a dull aching pain and swelling of the scrotum

H Harold Scott

SUMMERS (William A) Experimental Studies on the Larval Development of *Dirofilaria immitis* in certain Insects — *Amer J Hyg* 1943 Mar Vol 37 No 2 pp 173-178

TORRES ESTRADA (Antonio) Ophthalmoscopic Observation on Microfilarias in the Vitreous of Patients Infected with Onchocerciasis — *Amer J Ophthalm* 1942 Dec Vol 25 No 12 pp 1445-1448

Patients with onchocerciasis often report that they see tiny worm like bodies in their eyes SILVA in 1925 merely by illuminating the fundus with a flat mirror saw microfilariae as very mobile very refringent bodies with golden reflections with the Gullstrand ophthalmoscope he saw the shadows of the microfilariae on the retinal surface OCHOTERENA [this *Bulletin* 1930 Vol 27 p 992] and STROVG [*ibid* 1932 Vol 29 p 82] found microfilariae in sections of the conjunctiva cornea choroid and retina [cf also SEMADINI this *Bulletin* 1943 Vol 40 p 616] TORROELLA first used the slit lamp microscope [cf also SEMADINI above] for the detection of microfilariae and observed them in the anterior chamber But the corneal microscope can be used only in well equipped laboratories in order to see the posterior portion of the vitreous a Koepe microscope and a special contact glass must be used The examination fatigues the patient and the microfilariae are difficult to see because they are very thin and refringent very mobile and are scarce in the anterior chamber They are best seen with low magnifications and can be seen with a hand lens

The author found that microfilariae in the vitreous are most easily seen with the electric direct image ophthalmoscope using a +20 to +40 diopter lens the refraction of this combined with that of the refraction system of the eye makes possible observation of the microfilariae in fine detail The punctate keratitis which is often present does not interfere because it appears late in the disease and begins at the periphery of the cornea nor do exudates in the pupil due to iritis

Microfilariae seen in the anterior chamber with the corneal microscope i.e. by direct light look like white very fine active filaments with golden reflections Microfilariae seen with the ophthalmoscope

ie by transmitted light look like very fine black filaments on a reddish background they reminded the author of the appearance of mosquito larvae in water and patients also use this simile they only look refrinent with golden reflections (ie as they appear by the slit lamp microscope) when they come very close to the posterior part of the lens. The observation is best made with the pupil dilated.

The electric ophthalmoscope is simple examinations with it can be done anywhere the general practitioner and visiting nurses can detect microfilariæ with it. Microfilariæ seem to be more abundant in the vitreous than in the anterior chamber and may be seen in the vitreous early in the disease. They may be found there in patients in whom none is found in the anterior chamber and in whom biopsy of the skin has been negative. The author examined 11 cases of onchocerciasis and found microfilariæ in all of them by ophthalmoscopy of the vitreous. Microscopy of the anterior chamber revealed them in four of these cases only. Six of them had keratitis. In other words vitreous ophthalmoscopy is better than corneal microscopy.

The microfilariæ are negatively phototactic being more apparent in the anterior chamber at night than by day and more numerous at the periphery of the pupillary field during examination than within it at the beginning of the examination especially if the patient has stayed in a dark room some are often seen in the centre of the field but a few minutes later they have fled to its periphery. [Nematode larvae usually behave thus on a slide under the microscope. They prefer diffuse light those living on pastures being most active at dawn and dusk so that infestation of farm animals is more likely at these times.]

G. Lapeere

KUITSINEN EKBAUM (E.) The Incidence of Enterobiasis in Toronto —
Canadian Med Assoc J 1943 Mar Vol 48 No 3 pp 229-231

A survey of enterobiasis in Toronto showed the incidence of 60 in 300 children and 5% in 56 adults examined.

In 29 of the 34 families examined either all members of the family or the majority of them were infected with pin worms. Five families examined were free of infection.

The NIH swab was used with an average of 6 swabs per person.

HEADLEE (William Hugh) Pinworm Infections among Patients of an Indiana Hospital for Children — *Amer J Trop Med* 1943 Mar Vol 23 No 2 pp 281-284 [10 ref.]

Perianal scrapings collected by means of the NIH cellophane-tipped swab were examined from 240 patients of the James Whitcomb Riley Hospital for Children. These included 128 males and 112 females with ages from 21 months to 18 years. They were residents of both urban and rural areas throughout the state and came from 71 of the 92 counties. Only one perianal scraping preparation was examined from each patient. A total of 39 individuals (70 males and 19 females) or 16.3 per cent were found to be infected with the pinworm *Enterobius vermicularis*. The corrected incidence on the basis of the examination of seven swabs was 24.7 per cent. Eosinophil counts from both positive and negative individuals were analyzed. There seemed to be no correlation between the eosinophil count and the presence or absence of an infection with *Enterobius vermicularis*.

PERRIN (Tomas G) Algunos estudios sobre triquinosis ignoradas [Studies on Undiagnosed Trichiniasis]—*Rev Med Trop y Parasit* Habana 1942 Sept-Oct Vol 8 No 5 pp 59-64 With 5 figs [28 refs]

In the diaphragms of 25 of 200 cadavers (12.5 per cent) of persons without a clinical history of trichiniasis the larvae of *Trichinella spiralis* were found by direct microscopical examination. The number of larvae per gm of muscle varied between 0.5 and 27. The proportion of 0.01 larva per gm is regarded as simple zoological trichiniasis, and values higher than this suggest clinical trichiniasis. Of the 25 positives 15 were men and 10 women, the ages varying from 19 to 87, although most of them were over 30.

Working with the Bachman Bozicevich antigen (prepared without phenol and diluted 1 in 10,000) supplied by the American National Institute of Health, the author obtained positive skin reactions in 18 out of 125 persons who had not shown previous signs of trichiniasis, so that 14.4 per cent were probably infested. Of 14 of these 18 positives, 10 had an eosinophilia of 5-8 per cent. When 8 medical men were skin tested, 3 were found positive; one of them had suspected a year and a half earlier that he had trichiniasis. A year after receipt of the antigen injection of 0.04 cc (double the dose given in the earlier tests) gave positive results in 3 cases of trichiniasis, but negative ones in 4 cases of infestation with *Trichocephalus*, 2 with *Ascaris*, 2 with *Enterobius* and one with *Ancylostoma*. After 16 months in the refrigerator the antigen gave positive tests in 2 cases suspected of trichiniasis with eosinophilia of 13 and 23 per cent respectively. After 25 and 26 months in the refrigerator one patient with the clinical picture of trichiniasis and another suspected of the disease both gave negative skin tests. Probably it was then inactivated by age and cannot be kept longer than 18 months. The high percentage of cases now known in Mexico justifies measures for the control of pig breeding (prevention of the access of rats, the cooking of food given to pigs, etc) and education of the people in the proper cooking of pig meat.

G Lapage

DEFICIENCY DISEASES

HEILIG (Robert) Clinical Experiences on Vitamin Deficiencies in Mysore—*Indian Med Ga* 1943 Mar Vol 78 No 3 pp 129-134 [53 refs]

In India, states the author, at least outside the big cities and research centres, nutritional deficiencies are far too rarely recognized as such, and still more rarely is the deficient factor or group of factors properly determined. From investigations carried out in many parts of the country, it may be justly concluded that vitamin A and B deficiency is common; that there is lack of animal protein, calcium and fat; vitamin C deficiency is noticeable in famine areas and vitamin D where the purdah system is in force. The author then proceeds to speak of various syndromes he has observed in Mysore attributable in part at least to one or more of these deficiencies, backing his opinion by references to the literature, and he concludes that the people are

living on the borderline of numerous deficiencies and that any additional strain may precipitate symptoms. Ankylostomia is very rife and if vitamin B is wanting severe anaemia may appear. To increase natural resistance is not merely a question of additional income intake of vitamin C (Jamshedpur is given as an example on the authority of K. MITRA [see *Bulletin of Hygiene* 1940 Vol 15 p 619]) was found to be higher among the poorer classes than among the well-to-do. Hospital patients often refuse milk and milk products because they believe they cause cold and swelling all over the body; they prefer grossly overcooked vegetables. It will be necessary to educate the people in the right use of foodstuffs and the proper preparation of them—a laborious undertaking.

H. Harold Scott

COFINO UBICO (Ernesto) & ARCELDAS KLEE (Gustavo). Contribucion al estudio de ciertos edemas de la infancia (Sindroma debido a carencia alimenticia múltiple.) [Study of certain Forms of Oedema in Children. Syndrome due to Diet Deficiency].—*Mem d I Confer Med Cent oamericano San Salvador 5-1º Vol 1938* pp 543-580. With 10 figs.

The authors have carried out a serious piece of work investigating from the clinical and laboratory sides an important problem. They have observed many children between one and six years of age with digestive disorders, changes in the skin and hair and modification in the blood proteins. A similar condition has been described in San Salvador, Costa Rica, Mexico and Cuba. It is common among the poorer classes. It is due fundamentally to diet defects, notably in fats, protein and vitamins, with excess of carbohydrates and cannot be ascribed to any one deficiency in particular. Examination of the blood reveals more or less important diminution of total protein, loss of albumen and increase in globulin. The method of determination of blood protein is described in detail using small quantities (1-2 cc) of serum.

Treatment consists in blood transfusion and change to adequate diet. Transfusion should be started at the first sign of the oedema; for the more promptly it is used the more rapid and complete the cure. It benefits in cases apparently desperate and is to be repeated as often as necessary to produce appreciable benefit. Improvement of the diet should start with increase of proteins of animal origin, then of fats. Care is needed because the alimentary tract is very easily upset and vitamins B and C are all important.

H. Harold Scott

SPRUE

INCELFINGER (Franz J). The Diagnosis of Sprue in Nontropical Areas.—*New England J of Med* 1943 Feb 11 Vol 228 No 6 pp 180-184. With 2 figs. [23 refs.]

Sprue and sprue-like conditions are not rare in northern latitudes but complicating features are often so prominent that the underlying disorder is not immediately recognized.

The outstanding feature is excess of output of faecal fat. The general opinion is that this is due to malabsorption of lipids but it

is more likely that patients with this disease absorb all substances slowly even water and gases glucose and amino acids. The small intestine is long enough to compensate for delayed absorption rate of glucose and amino acids so that these substances do not appear in excess in the faeces. Fats are much more slowly absorbed and delayed lipid absorption causes fatty substances to be spilled over into the colon.

Patients who have suffered from extensive granulomatous disease of the small intestine resections or short circuit of the small intestine also have steatorrhoea but in these cases curtailment of the absorbing surface is responsible.

Of the four patients forming material for this study two never passed typical greasy stools though they were found to have steatorrhoea. Abdominal distension has usually been ascribed to intestinal fermentation but a better explanation is provided in the marked loss of intestinal tone which prevents proper propulsion elimination and absorption of gases.

The anaemia of sprue may simulate that of pernicious anaemia or may be hypochromic and microcytic. Two of these patients had microcytic and two macrocytic anaemia. In sprue liver extracts benefit the anaemia especially if severe but the amount necessary is two or three times as great as that needed in pernicious anaemia.

Each of the four patients had tetany. Formerly hypocalcaemia was ascribed to formation of insoluble calcium soaps in the intestine. The pH of the small bowel however rarely rises above 7.5 and it is known that in a medium with a pH of less than 8 many soaps do not form hence the suggestion that faulty calcium absorption is a secondary result of poor absorption of vitamin D offers a more reasonable explanation of hypocalcaemia. Thus massive vitamin D therapy will raise the serum calcium level in patients with steatorrhoea. On the other hand increasing the fat in the dietary is followed by an increased output of faecal calcium.

In spite of low serum calcium content none of the patients showed definite osteoporosis of the long bones and the serum phosphatase levels were normal.

One patient who was admitted to hospital with haematuria developed purpura with bleeding from the nose and mouth and formation of extensive purpuric areas over the body. The prothrombin time had dropped to 1 per cent of normal. The cause of this deficiency is probably the same as that of hypocalcaemia and is due to failure to absorb vitamin K.

Patients with tropical sprue usually have striking evidence of deficiency of the vitamin B complex especially of nicotinic acid and riboflavin. One patient exhibited cheilosis angular stomatitis and glossitis also prominent was the deep fiery red colour of the mucosa of the proximal and dorsal portions of an ileostomy which had been performed. Administration of thiamin hydrochloride (10 mgm three times daily intramuscularly) aggravated the condition. Thereupon he was injected with a preparation of vitamin B complex (3 mgm of thiamin 10 mgm nicotinic acid 0.5 mgm riboflavin 0.45 mgm pyridoxine and 1.68 mgm pantothenic acid per cc) 2.5 cc of this preparation daily together with 2.5 cc of crude liver extract resulted in the disappearance of these symptoms. The observations suggested that the patient was unable to absorb the vitamin B fractions when given by the mouth.

Symptom of vitamin A deficiency were also present. Two patients complained of night blindness. The fasting level of vitamin A in the plasma were strikingly decreased in three patients. After a large dose (20 000 I.U.) of vitamin A by mouth little absorption occurred as far as could be ascertained by the plasma levels. Low carotene values in the blood are significant in the diagnosis of steatorrhoea but low vitamin A values are found in other disorders. *P. Manson Bahr*

HAEMATOLOGY

MIRAGLES (Vicente). Anemia semilunaris de células lacrimiformes. Sickle Cell Anaemia. — *Rev. Med. Trop. y Parasit. Habana* 1941 Sept-Oct Vol 7 No 3 pp 90-93 With 7 figs. [35 ref]

A good general account of this curious condition illustrated by report of two cases and of the post mortem finding but it adds little to the knowledge we have already. The author's investigations show him that sickle cell without anaemia are a family and hereditary characteristic of 5 per cent of North American negroes while sickle cell anaemia occur in only 0.2 per cent. The cases he describes in detail are in a boy of eleven who had been ill for five years and in a woman of 28 years.

The following statements are based on reports in the literature and on the author's own study. The number of corpuscles ranges between one million and three million per cmm some 90 per cent being sickle shaped haemoglobin 40-50 per cent there is leucocytosis between 15 000 and 40 000. Normoblasts are many and reticulocytes much increased platelet normal or slightly increased. Males are affected about twice as often as females the average age of patients is 12 years. The blood plasma is yellowish van den Bergh direct is negative in most indirect positive in nearly all. Jaundice is present and in many urobilinuria. Patients are very susceptible to infection and death from intercurrent disease is common so the pathological findings are often complicated by lesion set up by the secondary or terminal affection. The heart is usually hypertrophied the liver enlarged and congested the Kupffer cell phagocytize many of the sickle red cells. The spleen at birth is enlarged in the early stages of the disease (our tables) but later diminishes and in older patients is very small. He gives the following figures of spleen weight. In 13 patients under 5 years of age the weight is 21 gm. the average in 20 patients over five years is 63 gm. the average weight in 20 below ten years is 206.8 gm. of 18 over ten years 56.71 gm. In the early stage the spleen is of a dark red colour the Malpighian corpuscles small and separated. In later stages the organ small with a thick wrinkled fibrous capsule small pulp with fibrous trabeculae and Malpighian corpuscles atrophied and there are pigment deposits surrounded by giant cells. The arteries have thickened walls perhaps calcified. The kidneys are congested with sickle cells and the tubule epithelium contains much detrital pigment. The bone medulla hyperplastic.

The author notes the parallelism between sickle-cell anaemia and familial haemolytic jaundice both are familial and hereditary both

present a haemolytic type of jaundice and destruction of red corpuscles the type of anaemia and the bone marrow changes are similar both have haemolytic crises with increase of jaundice and excretion of pigment diminution of haemoglobin and corpuscle count and pain in the epigastrium and left hypochondrium and finally both are benefited by splenectomy [The value of this operation in sickle cell anemia is debatable The author seems to imply that the benefit occurs if the patient is seen early while the spleen is enlarged] On the other hand differing points are the poikilocytosis and the susceptibility to reticulo-endothelial phagocytosis of the red cells the normal resistance to fragility tests and the spleen changes *H Harold Scott*

DERMATOLOGY AND FUNGOUS DISEASES

CELIS PEREZ (A) Un caso de cromo blastomycosis de localizacion nasal y laringea [Nasal and Laryngeal Chromoblastomycosis]—*Gac Med de Caracas* 1943 Jan 15 Vol 50 No 1 pp 8-10

The author can find no previous case in which this condition has been localized in the nose and larynx. The patient was a negro 20 years of age. His nose was enlarged of elephantiac aspect covered with small nodules (mamellones) scars and ulcers. The patient first noticed a verrucose condition of the exterior of the nose [how long before is not stated] which later ulcerated and satellite nodules and ulcers appeared. When seen by the author these were fairly numerous but there was no adenitis no pain and no itching. Laboratory examination proved the lesions to be due to Chromoblastomycosis. The nostrils were almost blocked but the nasal mucosa was not affected. The mouth and pharynx [the author says larynx—an obvious slip] were normal. As the patient's voice was hoarse the larynx was examined and nodules and granulations were seen on the vocal cords. A biopsy specimen sent to the laboratory was reported upon as chronic inflammation with granulations and inflammatory infiltration. The Kahn test gave a 4 plus. Antisyphilitic remedies had no effect on the laryngeal lesions. At this point biopsy from the nose showed the true nature of the lesion. Sodium iodide and trypanflavine with local application of sulphanilamide were also without effect. Electrocoagulation was then applied with great benefit. The patient asked permission to leave hospital promising to return. Needless to say he did not do so and the further progress is not known. The author regards the laryngeal condition as due to the same cause as the nasal because of the similar appearance and the failure of anti-syphilitic treatment. The condition appears to be one which develops slowly and has little if any tendency to generalization. *H Harold Scott*

NINO (Flavio L) Ulcera micotica de cornea Estudio micologico de una observacion [Mycotic Ulcer of the Cornea]—*Bol Inst Clin Quirurg* Buenos Aires 1943 Feb Vol 19 No 154 pp 115-132 With 3 plates & 14 figs [18 refs]

The following is a translation of the author's summary —

1 A fungus has been isolated from a corneal ulcer which had resisted treatment. A study of this fungus is reported.

2 This study indicates that the parasite is a porothrix possibly *Saccharomyces* *foetecens* Pereira Filho 1929

3 Intensive treatment with iodide and extirpation of the lachrymal sac produced definite cure

4 Ocular porothriasis is not common in Argentina to judge by the literature hitherto published C II

VISCELLANEOUS

MILITARY (Edward Philpot) & MONROE (John Luther) Preliminary Report on the Infectious Diseases of Enemy Occupied Territories Part I The Japanese Mandated Islands and Guam — *Jl Trop Med & Hyg* 1943 Apr May Vol 40 No 2 pp 15-23 [79 refs]

This is a detailed account of the diseases of a region for which information is not easy to obtain. There is a long list of references which should be a great help to those wishing to pursue the matter further. The paper cannot well be abstracted but the information given should be in the hands of those who may have to deal with the medical problems of these islands when they have been occupied by the Allies C II

EHRLICH (Otfried) Ueber die Verbreitung der Infektionskrankheiten in der Ukraine [Infective Diseases of the Ukraine] — *Arch f Hyg u Bakt* 1943 Vol 129 No 16 pp 74-107 With 2 pls [2 pages of refs]

This account is too much coloured by anti-Russian propaganda to be taken seriously but there is a long list of references which may be useful

BERRY (W T C) Nutrition Unit Medical Section Second Interim Report — *Norfolk Island Protectorate Ann Med & San Rep for Year ending 31st Dec 1941* pp 11-14

An interim report dealing with tropical ulcer. Lake-shore people cultivating cassava had a profitable year in 1940-41 when shortage of food in the hills drove the hillmen down to buy food. The Lake-shore dwellers disposed of more than they could afford to lose and became port themselves and towards the end of 1941 had to dig up immature cassava of poor nutritional quality, the calorie value was low and susceptibility to ulcers arose. Ulcers have been ascribed to a diet low in protein, fat and vitamin B complex and high carbohydrate. [In the present state of our knowledge it would perhaps be wiser at all events safer to say found associated with rather than due to.]

Much of the protein normally used was the vegetable protein of maize. In the institution here reported this was supplemented by lean meat of which an average daily amount of 15 gm per kgm body weight was given raising the total intake to 3-4 gm per kilo. A group of forty children were given this diet while two control groups were formed from the nearest villages. The following table gives the number

	Total no abrasions	Duration in weeks taken for healing													Progressing
		1	2	3	4	5	6	7	8	9	10	11	12	12+	
Meat fed group	288	95	79	41	17	0	9	5	1	5	3	2	1	7	
Control group I	184	67	50	29	10	8	3	33	—	—	1	1	—	7	
Control group II	322	115	98	54	0	4	5	17	3	1	2	1	1	—	

of abrasions observed and the time for healing to take place [The number in control group I given as 184 should be 214 but this does not affect the accuracy of the rest of the table]

[It will be seen from this that for quick healing—one week—the control group II was best 35.6 per cent the experimental group next 32.9 and the control group I 31.3 per cent in the second week the same order is maintained the respective percentages being 30.3 27.4 and 23.3 The author states that there was no obvious improvement in general health nor was there significant gain in height or weight in the meat fed group There would therefore seem to be no advantage gained from the increased protein] Vitamins A and C are available in most abundance at the height of the ulcer season Bacteriologically in December to April i.e. during the rainy season 22.8 per cent of 381 abrasions showed fusiform bacilli during the rest of the year only 7.9 did so [More investigation is clearly needed to elucidate the causes and reasons for prevalence of tropical ulcers in Nyasaland]

H. Harold Scott

BASU (Arun Kumar) Endemic Tropical Ulcers (Naga Sores) among the Coolie Recruits in the Jungles of Assam—*Jl Indian Med Assoc* 1943 Mar Vol 12 No 6 pp 161-165

The ulcers described are common in those working in damp steamy jungles as in Assam Cochin China Malaya Melanesia for example The author's cases ten of which are described were among coolie recruits from Singhbhum district to work in Assam In some the ulcers developed while they were on their way home They were nearly always on the legs and feet and started as small hard pink papules which within 48 hours became vesicles and broke discharging blood tinged serum and forming an ulcer at first shallow then extending superficially and in depth occasionally they were multiple and fusion would take place Two patients died after the ulcers became septic and gangrenous Fusiform bacilli and Gram positive diplococci were seen but not Leishman Donovan bodies Experimental inoculation into a skin wound showed that the condition was infective application of the discharge to unimjured skin did not give rise to any lesion

The usual methods of treatment of ulcers by disinfectants formalin mercurial ointments etc proved ineffectual The following however gave very satisfactory results The patient was put to bed and the limb immobilized by splints the ulcer was cleaned with E.C. lotion

[nowhere does the author give a hint as to what E.C. stands for which is unfortunate as other might like to try the treatment in intractable tropical ulcers] or if the discharge was great the leg was placed in a bath of it for half an hour and rectified spirit applied to the ulcer and around it. It was then dressed with 2 per cent tartar emetic ointment and bandaged. Later the strength of the ointment was doubled. Urea tibamine was given intravenously on alternate days starting with 0.05 gm in 10 cc of 25 per cent glucose solution increasing to 2.0 gm. Cod liver oil was given twice daily. Cure was usual in a fortnight. [There would naturally be a desire to obtain a cure as rapidly as possible but it seems a pity that the tartar emetic the urea tibamine and cod liver oil were all employed together for it is impossible to tell which was mainly responsible for the happy result.]

H. Harold Scott

HENDERSON (J. M.) The Relation of Sunlight to Desert Sores — *Brit Med J* 1943 May 29 pp 657-659

In appearance and course desert sores were quite different from furuncles and from septic sores following chafing insect bites or epidermophytes. The individual lesion started as a water blister 2 to 10 mm in diameter which sometimes began to form before the blister appeared although when the vesicle was fully formed there was neither itching nor pain. After 12 to 24 hours the blister ruptured and the lesion then developed into a purulent spreading subepithelial nodule (sic) 1 to 3 cm in diameter which was resistant to treatment some 2 or 3 weeks elapsing before healing was complete. Occasionally there was an associated low grade lymphangitis or adenitis. The lesions were multiple and when a patient presented himself for treatment it was not uncommon to find vesicles forming as well as developed sores. Out of 50 patients 12 had coincident impetiginous lesions of the face but the fluid from the initial blister of the desert sore appeared sterile and produced no reaction on intradermal inoculation into a normal person. Although trauma may have played some part in determining the site of certain of the lesions many sores occurred on areas where there had been no injury and in 21 of the 30 patients there was no history of trauma. It is suggested that the chief aetiological factor was the action of sunlight aided perhaps by slight trauma on skins reacting badly to exposure to the sun. The sores occurred only on those areas of the limbs exposed to the sun and chiefly in persons whose power of adaptation to sunlight was below the average and whose skin reacted to exposure with erythema dryness and scaling. Cases appeared almost in epidemic form at the beginning of the desert summer their incidence seemed to have no correlation to the time that the individual patients had spent in the desert and in patients who had more than one attack the sores appeared only during the summer months. While the effect of a vitamin deficiency could not be discounted the absence of any of the features of scurvy seemed to indicate that vitamin C was not involved and it was also reported that similar sores occurred in troops receiving adequate amounts of fresh food. [Other observers have however felt that the incidence of desert sores may have some significant connexion with the absence of fresh fruit or vegetables.] It is suggested that the susceptible type of person should wear clothing adequate to protect against sunlight and that a sunburn cream or oil

preferably containing a small amount of antiseptic might be helpful. Some men in the absence of a medical officer found germolene and elastoplast useful in treatment of the sores. *F Murgatroyd*

LEEDHAM GREEN (J C) & EVANS (Winston) Myositis Tropica — *Trans Roy Soc Trop Med & Hyg* 1943 May Vol 36 No 6 pp 359-362

The authors describe briefly the characteristics of 20 cases of tropical myositis all in natives. 11 were from Nigeria seven from the Cameroons and two from the Gold Coast. All presented tender swellings which might be circumscribed or diffuse and involved the limb muscles. The temperature was not as a rule high usually 101-102 F occasionally a degree higher. In one case described in detail there was a leucocytosis of 11 000 per cmm. Pus was found on incision in five of the patients and *Staphylococcus aureus* was isolated. In others although heat and fluctuation were present incision released no pus but on microscopical examination of tissue removed by biopsy the muscles involved were glassy and oedematous there was loss of striation and monocyctic infiltration of the interfibrillar connective tissue with fibroblastic reaction around the necrosed area.

[There is probably nay certainly more than one form of myositis in the tropics that described by the authors they consider to be an acute degenerative condition characterized by haemorrhage into the intermuscular tissue spaces together with a mononuclear cell infiltration producing an appearance similar to the coagulative necrosis of muscle (Zenker's degeneration). They offer no suggestion as to aetiology of this curious condition. See this *Bulletin* 1942 Vol 39 pp 348-394 1940 Vol 37 p 225 where numerous other references are cited.] *H Harold Scott*

MACLEAN (Kenneth S) Observations on Sunstroke and Heat Exhaustion in the Tropics — *Jl Roy Nav Med Serv* 1943 Jan Vol 29 No 1 pp 31-36

Of 21 patients suffering from conditions directly attributable to heat in the crew of a cruiser only one showed hyperpyrexia the remainder suffered from heat cramps (fireman's cramps). The symptoms of heat cramps are — the muscular pains from which the condition takes its name headache vomiting dizziness and sometimes rapid panting respiration. Collapse and death may occur if treatment is not given. In some cases however the patient may complain of headache nausea and dizziness only in most cases the temperature is normal. Cases in which cramps occur should always be regarded seriously.

It is known that cramps are due to excessive loss of chloride during profuse sweating and firemen have long realized that cure lies in the drinking of water to which common salt is added. Administration of salt was therefore the basis of the author's treatment and proved highly successful. 2 pints of water containing 2 drachms of salt were taken in sips during each 24 hours. In addition 8 pints of sweetened fluid to which 1 drachm of sod bicarb was added were taken each day. In severe cases or when vomiting occurred rectal or intravenous salines were given.

The author however was not satisfied with the treatment of case in which the condition had developed and turned his attention to method of prevention. Ship's water distilled at sea contains little or no sodium chloride: an epidemic of 14 cases occurred after 12 days at sea. He therefore instituted the following procedure —

(1) One lb. of salt per diem was added to the distilled water for every 350 men carried. Assuming that 10 per cent of this is drunk, this ensures that on an average each man gets 20 gr. of salt per day as a basic ration. In addition men are instructed to add at least half a teaspoonful of salt to their drinking water each day (i.e. an additional 30 gr.).

(2) All rating keeping watches below should take half a teaspoon of salt in a pint of water every time they go on watch.

(3) Everybody was instructed to take a teaspoonful of salt in a pint of water immediately they felt the slightest ill-effects such as nausea, headache or dizziness after working below or being in the sun. Provided the water is ice-cold this is quite a palatable drink.

A description is given of a case of hyperventilation tetany in a man who showed signs of heat exhaustion. The theory advanced is that deficiency of sodium chloride in the body may irritate the respiratory centre.

C II

TREI (Rudolf) Pseudo Tuberculosis of the Lungs with Eosinophilia
Contribution to Treatment — *Ind an Med Ga* 1943 Feb Vol 78
No 2 pp 70-71 With 5 figs on 1 plate

Two cases of so-called eosinophilic lung are here recorded but as an Editorial note aptly states: "It is difficult to see how the diagnosis in this [the second] case is justified." Idiopathic eosinophilia is very common in this country. The cardinal symptoms are infiltrative processes in the lungs with fever, cough and sputum which is free from *Mycobacterium tuberculosis*. Another important point is that the first patient reported here was a European 41 years of age. He stated that for 6-8 weeks he had had a cough specially troublesome at night, a temperature to 101° F or more, he felt weak and had lost more than 20 lb. in weight. Physical signs resembled those of bronchitis and asthma. X-rays showed an evenly distributed mottling. Blood sedimentation was 24 minutes; there was a leucocytosis of 23,400 of which 8 per cent were eosinophiles. After other drugs had proved ineffective the patient was given acetylsalicylic acid 1 cc, 2 cc, 3 cc intramuscularly on alternate days and thereafter 3 cc every third or fourth day till a total of 36 cc had been administered. After about four weeks the sedimentation time was two hours and three weeks later the leucocyte had fallen to 6,500 and eosinophiles to 8 per cent. Two months later, after a visit to South Africa, the patient was again examined and the eosinophiles were only 4 per cent and he said he felt quite well; he had regained his normal weight and X-rays revealed no abnormality.

The second patient presented somewhat similar symptoms but he had also signs of old tuberculosis in the lungs. His treatment with acetylsalicylic acid was interrupted by an attack of lobar pneumonia and on recovery from this the other condition had also cleared up and the eosinophilia which before treatment was started was 72 per cent of a total leucocyte count of 38,600 had fallen to 4 per cent in a normal blood picture.

H. Harold Scott

PRIETO CASANOVA (Jose T) Contribucion al estudio de los infiltrados pulmonares fugaces [Transient Infiltration of the Lungs]—*Rev Policlínica Caracas* 1942 Nov-Dec Vol 11 No 67 pp 323-356

This is a very full account of the condition some cases of which at least go by the name of Loeffler's syndrome [see this *Bulletin* 1941 Vol 38 p 538]. In the course of examination of 1 173 persons 998 adults and 175 children 33 cases were found (2.8 per cent) 18 were among the adults (1.8 per cent) and 15 among the children (8.5 per cent). The sex proportions were among adults females 11 males 7 among children 11 and 4 respectively.

The author defines the condition in the following words [translated]. Transitory pulmonary infiltration is [shown by] a shadow discovered accidentally on X-ray examination without symptoms transient and benign. X-rays may show clouding or pneumonic bronchopneumonic or reticular shadows. He makes no mention of the eosinophilia as a characteristic because he maintains this is met with in a certain group of cases only.

Causes to which the condition is attributed are many among them influenza asthma tuberculosis diphtheria or other infectious fevers—scarlet fever measles whooping cough—parasitism generally especially helminthic allergy to the pollen of *Ligustrum vulgare* or a combination such as influenza and ascariasis tonsillitis and the same worm and so on the transient migration of the *Ascaris* larvae causing the infiltration.

The author adopts the following classification (1) Transitory tuberculous infiltration (2) Typical (according to the definition) (3) Atypical. The first he regards as a toxic or allergic manifestation in a tuberculous. The second includes the Loeffler syndrome asthmatic and allergic cases and those of parasitic origin. The third includes those associated with influenza or pneumonic or bronchopneumonic foci. Blood examination in 22 cases showed—no eosinophilia (3 per cent or under) in three moderate (5-15 per cent) in eleven and over 16 per cent in eight. Corpuscle sedimentation was usually normal in rate but occasionally slightly increased. *Mycobacterium tuberculosis* was looked for in 23 patients but was not found in any. Faecal examination of 19 subjects yielded no parasites in 9 ova of *Ascaris* in 4 of *Schistosoma mansoni* in 1 *Trichuris* in 2 and cysts of *E. coli* and *E. histolytica* in 3 but only one examination was made in each case. He concludes that (1) The condition is fairly common in Venezuela. (2) It may be provoked by parasitism (*Ascaris* *Schistosoma*) infection (influenza tonsillitis) allergy (asthma) bacteria (*Mycobacterium tuberculosis*). (3) Symptoms bear no relation to the extent of lung involved the condition is usually found by chance when symptoms are slight or absent. (4) Eosinophilia may be present but in some the proportion is normal. (5) Prognosis is good except in tuberculous patients. [We have dealt with this article fairly fully because it is a genuine attempt to throw light on an obscure question but we feel bound to add that from the evidence adduced mere concomitants have been raised to aetiological status on insufficient grounds and that the number of cases is far too small to enable such wide generalizations to be drawn.]

H. Harold Scott

BRULE (Marcel) & PESTEL (Maurice) Intoxication par les fèves et hémoglobinurie [Favism and Haemoglobinuria]—*Presse Méd* 1943 May 8 Vol 51 No 18 pp 241-242

Two cases of this curious disease are briefly noted—a brother and sister aged 18 and 15 years respectively—were suddenly attacked by jaundice and the passage of blackwater. The elder died in five days with anuria and azotaemia; the younger recovered rapidly and completely. The condition was thought to be paroxysmal haemoglobinuria at first but the mother made much of the fact that the day before the onset they had both eaten heartily of a meal of bean flour and that a month before they had both had a sudden attack of jaundice after a similar attack.

The rest of the paper is taken up with a general account of favism. It is common along the Mediterranean in Southern Italy, Corfu, Greece, northern Egypt and is caused by ingestion of the meal or inhalation of the flowering plant. Only certain members of a party or family eating the food (commonly broad beans *fève des marais*) are attacked and there is little doubt that allergy plays a part, probably a large part in producing the symptoms. [More ought to be known of this as a cause of haemoglobinuria. An excellent account of it is given in *Brit Tropical Diseases* 1942 Vol II p 1202 (see also this *Bulletin* 1942 Vol 39 pp 279-639)]
H. Harold Scott

GENEZZANI (U) Bean Disease (Favism)—*H. ref. h.* Jerusalem 1943 Mar 15 Vol. 4 No 6 [In Hebrew pp 95-97. English summary, p 97.]

MONTÉL (R) Accident dus à l'impact des filaments pécheurs de certaines méduses des mers tropicales aperçu sur ces Coelentères [Accidents due to Contact with Medusa Rays]—*Bull Soc Path Exot* 1942 Apr 22 & May 13 Vol 35 No 4-5 pp 168-176

The patient, a doctor, was bathing at Longhai, Cochun-China, when he suddenly felt a sharp pain like a burn in the left axilla, upper arm and side of the chest. The Annamite fisherman told him on his reaching land that he had been stung by a sua lua, a Medusa or jelly fish. The pain was severe and half an hour later he had difficulty in breathing, with a feeling of constriction of the chest and he became cyanosed. This was succeeded by pain of much severity with remissions in legs and feet and tremors of legs and arms. The symptoms lessened but were still present eight days later. He also suffered from nausea, meteorism, gastric crises and laryngeal irritation with irrepressible troublesome cough which prevented sleep, expectoration and great weakness accompanied by marked restlessness and a sense of impending death. Rhonchi and sibilant râles could be heard at both bases behind. There was marked albuminuria. Treatment consisted of cupping the chest, injection of antivenom C (20 cc), ephedrine, camphorated oil, stimulants etc.

The tentacles of these Medusa have special cells, cnidoblasts, enclosing nematocytes or small sacs with invaginated neck continued as a coiled spiral hollow filament in a toxic fluid. On contact of a foreign body with these cysts the filament is ejected and pierces the skin, injecting the toxin. According to BESREDA, the intensity of the

symptoms depends on the number and extent of the points of contact the chief symptoms are reduction of arterial tension acute emphysema and bronchial spasm and stimulation of the vagus and the lung is the seat of intense bronchial reaction and exudation with vasoconstriction

H Harold Scott

WILSON (H T H) & ELLIS JONES (D W) A Case of Acute Dermatitis occurring after handling *Pyrethrum Powder* with Treatment — *East African Med J* 1943 Mar Vol 20 No 3 pp 89-90

The use of pyrethrum as an insecticide is so widespread and cases of susceptibility to it so rare in comparison that the recording of this case is of no little importance. Use of the spray of pyrethrum powder caused irritation of the hands. The use of it again the next day was followed by itching and transient erythema. On the third day the patient used it for a longer period about half an hour and his hands became acutely inflamed with a vesicular erythema of the fingers, palms and front of the wrists. Within a week he had to be admitted to hospital on account of swelling of the hands and a red oozing from the skin and extension of the erythema. A little relief was obtained from local application of calamine lotion but again the lesions flared up the arms and face became oedematous with desquamation in patches. Much benefit was obtained from intravenous injection of 0.5 gm sodium thiosulphate in 10 cc water at five day intervals but the rash did not clear altogether till three months after the initial lesion appeared.

H Harold Scott

DASTIDAR (S K Ghosh) A Study of Tetanus and its Treatment with Magnesium Sulphate — *Indian Med Gaz* 1943 Feb Vol 78 No 2 pp 73-79 With 3 figs [11 refs]

The author's method of treating tetanus patients is to administer 25 per cent magnesium sulphate solution intramuscularly in doses of 5 cc to adults 2-4 cc to children and adolescents twice daily with injection of antiserum 9000 units repeated in 48 hours and if convulsions are severe morphine grain 1/4 and atrophine grain 1/100 glucose 50 cc of a 25 per cent solution was administered intravenously after each injection of morphine.

The author analyses 155 cases admitted to hospital [he mentions 211 in his summary but excludes 56 cases of tetanus neonatorum from his discussion] from the aspects of sex age incubation period in general and its relation to site of injury and mortality rates. The number is too small for valid deductions and the argument is at times rather arbitrarily selected. For example as regards sex incidence 86 were males and 69 females but the incidence in the males would appear to be nearly 2.3 times more than that in the females. This ratio is arrived at by excluding 31 cases in which the infection was acquired during or just after parturition.

It can be stated however that the magnesium sulphate injections seemed to control the convulsions and did not produce any ill-effects. The intramuscular route was chosen because intrathecal injection was not practicable intravenous injection is dangerous and may cause

sudden failure of respiration. In subcutaneous use the solution causes much pain. [For its use in tetanus neonatorum see this Bulletin 1927 Vol 24 p 493] H Harold Scott

PEARMAN (R O) & HASEMAN (L) *Cochliomyia Americana* Infestation in Man. Case Report—*Am S J* 1943 Mar Vol 117 No 3 pp 468-4. With 2 fig

BOOK REVIEW

ALLEN (Paul H) *Poisonous and Injurious Plants of Panama*—*Supplement to Am J Trop Med* 1943 Jan Vol 23 No 1 76 pp With 19 figs & 1 plate [Bibliography]

The author's object in writing this brochure on the Poisonous and Injurious Plants of Panama is very sound. Of the thousand of United States troops now enlisted a large proportion are concentrated in the Canal Zone district where they are constantly exposed to the temptation of Adam and Eve to eat of forbidden fruit. Hitherto they had perhaps some excuse for the Fall for they did not know it was forbidden but after reading what the author has written they can no longer plead that they have not been warned. All cannot read it but all medical officers should make a point of doing so and they should then give talks to the officers and men whose health is entrusted to them and the value of such a talk would be much enhanced by an exhibition of the poisonous plants. Meanwhile the general advice to avoid using any jungle fruits or seeds for food unless they are sure what they are should always be borne in mind.

Criticism is disarmed when the author acknowledges that his work is probably guilty of many sins both of omission and of commission and asks readers to notify him of points calling for correction or amendment. It is hoped says the author that this beginning may stimulate interest in the subject. There is no doubt that it will accomplish this and it is hoped that it will stimulate research into the toxic principles which in many cases are still undetermined and it is not improbable that some at least may prove a source of medicinal preparations.

More than a hundred plants are mentioned. It must have been difficult to find a satisfying classification but in the opinion of the reviewer that chosen is probably one of the least satisfactory in fact in the true sense it is not a classification at all some being grouped according to the symptoms they produce others according to structure and properties and a third group as accidentally harbouring parasitic insects. Most Stomach Poisons will cause purging as well as emesis hence to separate into two large groups. A Stomach poisons

(in which 36 are described) and B Purgatives and Emetics (10 described) leads to much overlapping and not a little needless confusion. Next comes a group of 32 Vesicants and Irritants which is separated from a fourth group of 14 Urticants although an Urticant is an Irritant and may be a Vesicant. Again this leads to an arbitrary severance of members of the same Genus. For example *Thaetia nudit* is described in Group A Stomach poisons while *Thaetia nervifolia* is to be found among the Vesicant and Irritants in Group C. *Solanum mammosum* and *S. nigrum* come under Stomach Poisons. *S. tuberosum* under another group 14 pages later. This is justified by the fact that the fruits of the former are toxic whereas it is the tuber of the last. One more example will suffice. Under *Andira inermis* we find The attractive pale purple flowers produced in terminal panicles. The fruit is globose. The bark in large doses is a dangerous poison and the seeds are said to contain a dangerous alkaloid. Unless the United States soldier is more highly educated than most this description will convey little to his mind. also no soldier is likely to eat the bark in large doses and though the seeds are poisonous there is no mention of the plant under this subjection in either group A or B. Similarly under *Mirabilis jalapa*. The roots have drastic purgative properties. The rough black seeds are also poisonous if eaten. This is grouped under Roots and Bulbs but surely the passer by would be more likely to chew the seeds than eat the roots.

If the present classification is retained for purposes of reference an Index is a necessity for one has to look through from the beginning to find any one poisonous plant. If there is no Index then the alphabetical order would be more convenient.

The publication is very helpful and complete in giving the local names for the plants among the different peoples of the Caribbean. The work is in the main a botanical description of each of the plants—in fact it is little more. The symptoms they produce receive but a word or two bare and there without details (except in the case of *Nerium oleander*) and treatment which after all is most important is not touched upon.

Information on *Manihot utilisima* a plant used extensively for its starch for making tapioca and cassava cakes receives scanty mention. That all varieties possess a greater or less percentage of hydrocyanic acid is not quite correct. They are cyanogenetic that is they contain a glucoside and an enzyme and on contact with water these react to form hydrocyanic acid. hence the first two or three washings are always thrown aside. In other places the author might well be more dogmatic and less cautious than he is. Thus all parts of the plant [*Jacquinia parianensis*] seem (our italics here and below) to be used as fish poisons. They either are or are not it should be easy to prove.

The poisonous principle [of *Abrus precatorius*] is reported to be Abrin and again The poisonous principle [of *Ricinus communis*] seems to be due to Ricin. He means the symptoms produced are due to the principle and in each case the fact is known the principles are abrin ricin which with crotin and robin are phytotoxins. The abrin states the author seems to be confined to the coating of the seeds. Whereas the needles of the crushed seeds have been well known in the East for a long time to be intensely poisonous when they penetrate the skin and they have been used for homicidal purposes and for killing cattle. There is little or no danger from swallowing the seeds.

when patients are louse infested the disease may be transmitted by the louse. This rat flea man louse man cycle has been described before from Shanghai and Mexico.

The same authors isolated *Rickettsiae* from mouse fleas, mice and human lice during an outbreak in Peiping. The flea strain did not give the Neill-Moser reaction in animals on first isolation and this is evidence that this reaction is not given by all murine strains. The mouse strain did not survive more than eight passages in rats, an unexpected finding for which no explanation is forthcoming. The louse strain corresponded to the mouse strain. They conclude that the first human case was probably originated by flea transmission from the rodents and later cases were due to louse transmission. In comment MCGAW notes that the commonly accepted criteria for distinguishing between the *Rickettsiae* of historic and murine typhus were discredited in this investigation.

LIT *et al.* (p. 613) discuss further the question of typhus in Peiping, and bring additional evidence to support their view that flea-borne and louse-borne typhus coexist and that epidemics may originate from rodent reservoirs.

GROOT *et al.* (p. 140) report malarial outbreaks of typhus in flea louse infested people of Colombia. The true nature of the disease had not been determined at the time this report was written but conditions were favorable to spread by lice. Later work however enabled GROOT (p. 437) to state that the *Rickettsiae* of the typhus of Varadero, Colombia, had proved on investigation to be of the classical (flea-borne) type. Suspensions of lice collected from a patient were infective for guinea pigs. Similarly, PATINO-CAMARGO (p. 34) has identified *P. prowazeki* isolated from patients and from lice in an outbreak at Bogota, Colombia.

OTTO and BICKHARDT (p. 335) discuss the toxins of *P. prowazeki* and *R. prowazeki*. These are endotoxins easily destroyed by heat and by treatment with formalin or phenol though the *Rickettsiae* may remain infective after such treatment. The action of the toxins which is quite different from that of infection by the living organisms is rapid in mice which are killed in a few hours. The toxins are neutralized by specific immune sera.

Several authors have laid stress on the fact that typhus can be acquired by means other than infestation with infected lice. Thus WALTHER (p. 617) reiterates the fact that *R. prowazeki* may remain virulent for several months in dried louse faeces and that infection by inhalation or by the conjunctival route is possible. The blood of patients with typhus from the 7th to 17th day of the disease contains about 100,000 *Rickettsiae* per cmm and care should be taken in withdrawing it for examination. The Weil-Felix reaction is positive at 1:160 or over in almost all cases by the 6th day; this titre is regarded as diagnostic but the author notes that agglutination of *Rickettsiae* is a more specific test. Infective lice have been recovered from patients 4 days after the end of fever. MCCORMACK (p. 138) gives an account of an outbreak of typhus in Doheda; the infection was ascribed to the opening of a trunk in which for many years had lain undisturbed clothing belonging to members of a family which had suffered from outbreaks of the disease. If this is the correct view it would appear to have been an infection due to inhalation of infected louse faeces. KLOSSE (p. 675) refers to outbreaks of typhus in German prison camps under conditions which preclude the possibility of infection by the bites

of lice. The only possible vehicle for the *Rickettsiae* is the faeces of infected lice but further research is needed to show whether the infection is conveyed through the skin by inhalation or by smear infection. He emphasizes the necessity for the use of disinfectants on the skin and for the sterilization of clothing and bedding. LIEBAU (p 755) describes the onset of typhus in a military medical officer not exposed to lice. He presumes that the patient contracted his infection from blood while taking specimens for the Weil Felix reaction. He terms this blood smear infection. [It is a point worth bearing in mind by medical men called upon to deal with typhus see WALTHER above.] DORMANUS and EMMINGER (p 824) report a case of typhus due to transfusion of blood from a person incubating the disease. The incubation period in the recipient of the blood was 11 days.

FINDLAY (p 367) gives an account of the laboratory methods used in the investigation of typhus, commenting on diagnostic procedures, specific treatment and methods of vaccination.

In the *Monthly Bulletin Emergency Public Health Laboratory Service* (p 821) is an account of the reactions to *Proteus* OX19, OX2 and OXA of 100 sera from persons not suspected of typhus in England. Positive results occurred in low titre in a large number of cases but it is held that agglutination at titres above 1/64 after four hours incubation at 50 C are unlikely except in typhus. BUCHWALD (p 137) has tested the Weil Felix reaction of 300 sera from persons known to be free from suspicion of having had typhus. A considerable number of sera gave indefinite results showing flocculation visible only with the agglutinoscope. Thirty six gave definitely positive reactions to *Proteus* OX19 or OX2 in dilution of 1 in 25 but only two gave positive results at 1 in 50. No positives were obtained with *Proteus* OXA. In comment MEGAW points out that it is necessary to know if sera which give positive results at those titres would show rising titres during attacks of typhoid or other non Rickettsial fevers.

SEIFFERT (p 611) defines the typhus infection index as the percentage of persons in a community who react to *Proteus* OX19 in titres of 1/100 and over. In making a survey children are the best subjects because they frequently suffer from attacks which may easily be missed. He reports the results of a survey of German soldiers and Russian prisoners and notes that mild cases of the disease were found which would hardly have been detected by other means.

STELER (p 372) describes the technique of the dry blood agglutination test for typhus, the enteric group of fevers and the dysentery group. This consists of taking drops of blood which are allowed to dry on a slide (and which may then be kept for several days if necessary) and adding to them suspensions of the organisms relating to the different tests. Agglutination is readily detected. The results are claimed to be worthy of serious consideration and the method has been applied with success to the detection of these diseases in large groups of people. Extensive surveys can quickly be made. The same author (p 676) has used the dry blood agglutination test with a suspension of *Proteus* OX19 for surveys of the population in Poland. He has found that this test is usually positive in typhus but its importance lies in the detection of ambulatory cases or of symptom free carriers who would otherwise probably pass unnoticed. Some of these persons had had mild fever or had merely felt unwell, others had no symptoms of any kind except a rash. Children especially suffer from mild and unrecognized attacks of typhus. If these mild cases are

detected wide survey should be made not only of contacts but also of the general population and the subjects of mild attacks should be thoroughly deloused they usually harbour infected lice It is not known whether lice which feed on persons with mild attacks become as intensively infected as those which feed on heavily infected patients

VEINTEMILLAS (p 141) describes a rapid test for typhus which consists of the agglutination of a suspension of *Proteus* coloured with methylene blue by the serum or blood of the patient One drop of each reagent is used and the test is performed on a glass slide in essentials the test is the same as that originally described by WELCH and modified by CASTAÑEDA

HALLMANN (p 678) describes a rapid bedside test for typhus which is essentially the same as that already reported by VEINTEMILLAS above GROOT *et al* (p 678) discuss the laboratory methods used in the diagnosis of typhus in Narino (Colombia) a rapid slide test is used with *Proteus OX19* or with suspensions of *Rickettsiae* The latter test usually gives earlier and stronger positive results

JACOBI and DÖRSCHEL (p 754) note that positive results with the Weil Felix reaction are almost always obtained after five days (sometimes after three) in typhus and state that the dry blood test is equal to the standard test They discuss the early signs which may be found and the other diseases from which typhus must be differentiated

CALDER (p 366) has found positive results to the Weil Felix reaction (*Proteus OX19*) in a considerable number of cases of brucellosis and points out that mistakes in diagnosis may be made unless it is remembered that ascending titres against *Proteus* are found in typhus but not in brucellosis A similar note is made by FINDLAY (p 367)

GRONASHEWSKIJ (p 141) has failed to obtain evidence that the blood is infective for animals later than one day after the end of the fever in typhus though positive results were found during the febrile period and in one instance two days before the onset of the disease From these tests and from a study of the literature he draws the conclusion that there is no evidence of the existence of healthy carriers of the organism or of inapparent infection [This conclusion is at variance with the views of many other workers at the present time]

In a discussion of the outbreak of typhus which occurred in 1938-39 in the Ukraine CHASOVNIKOV (p 14) remarks that although other workers have reported cases in which no rash was observed he has not seen any case in which this cardinal symptom was absent [this claim is an opinion not universally shared] He describes the measures taken to control the disease in rural communities

MRUGOWSKI (p 541) deals with the variations in the clinical picture observed in cases of typhus in Central Europe symptoms often suggest other diseases such as influenza acute pharyngitis appendicitis polyarthritides or nephritis There is often an intermission of fever lasting a few hours between the fourth and seventh days LUZ (p 54) reports similar findings and states that in 16 mild cases no rash appeared compare CHASOVNIKOV above]

LAMPERT (p 824) describes a severe outbreak in guards at a prisoner of war camp in Poland which occurred in spite of control measures the fatality rate was 25 per cent but if 35 vaccinated persons are excluded it was 35 per cent There were no deaths in the vaccinated patients though some had received only one dose Two patients had neither fever nor rash but the Weil Felix reaction was positive This

reaction however was negative in three undoubted cases and it is noted that it is in general of no significance in prognosis. A second but milder outbreak is described in soldiers returned from the Russian front. The authors consider that their method of treatment (hot baths, transfusions of blood substitute and Ringer's solution) may have been responsible for the mildness of the disease in this outbreak but MEGAW in comment suggests that in view of the long incubation period it was probably an infection of low virulence.

MUNK (p. 369) lays stress on the very low blood pressure which is a feature of severe typhus and which may be a factor in the production of gangrene of the skin. In treatment he advocates the use of digitalis, caffeine, intravenous glucose and subcutaneous adrenalin.

WETZEL (p. 367) describes acute glomerulo-nephritis in typhus and insists that renal damage has not sufficiently been emphasized in the literature.

WALTHER (p. 542) has seen recurrence of slight fever during convalescence from typhus together with urticarial symptoms which he attributes to an allergic state.

Suspensions of lungs of mice heavily infected with *R. prowazeki* or *R. mooseri* contain enormously more infective doses than infected guinea-pig brains. DURAND and BALOZET (p. 543) have used lung suspensions for the inoculation of horses to produce curative sera. These sera have proved effective in prevention when mixed with infective material before injection intradermally into animals but their curative action remains to be judged by therapeutic tests in man. It is noted that the Weil-Felix titres do not correspond with the results of intradermal tests. These authors (p. 369) describe the results obtained from the treatment of typhus with serum from horses inoculated with Rickettsiae of murine and epidemic strains. This serum was used in 120 patients and there were 140 controls but the treated patients included only those who had not been ill for more than 10 days. It was sometimes difficult to get the history of a patient whose mental condition was seriously affected and as MEGAW points out in comment this may have led to the inclusion of fewer severe cases in the treated group than in the controls. The results as they stand indicate that serum treatment reduces the case mortality rate and tends to shorten the disease in the indigenous population of Tunisia where the experiment was carried out but it did not reduce the incidence of pulmonary complications. The few Europeans treated did not show appreciable benefit. In *Public Health Reports* (p. 611) there is a note that in Algeria injections of sera have given good results. [These sera may have been those described above.]

VAN MEERENDONK (p. 679) reports good results from treatment with atehrin combined with plasmoquine especially in older persons. If no benefit was obtained it is stated that there was usually a complicating bronchopneumonia which yielded to intravenous sulphapyridine. MENA (p. 452) has used sulphapyridine in the treatment of typhus but although it appears to have a beneficial effect on the secondary bacterial pneumonia which occurs there is no evidence that it influences the typhus itself. WOHLRAB (p. 826) writes unfavourably of the sulphonamide in typhus except in the treatment of complications.

MACKENZIE (p. 370) deals with the control of louse-borne typhus. He emphasizes the part played in times of epidemics by great movements of people by which the non-immune may be brought into

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SNIDER and ANDERSON (p 374) note that the cotton rat *Sigmodon hispidus* is susceptible to louse-borne typhus and is a suitable animal for laboratory work. It is not so susceptible to the murine type.

P of s OLA type Vector mte

GISEN (p 147) has found the chorio-allantoic membrane of the duck embryo to be suitable for the cultivation of Rickettsiae of mite-borne typhus which cannot be grown in the hen's egg. These egg strains show no loss of virulence. The fact that by this technique the Sumatran strains cannot be distinguished from those of scrub typhus supports the view that the organisms are identical [an opinion previously stated by LEWTHWAITE and SAUNDERS].

REVES and RICHARD (p 37) describe a case of mite-borne typhus in which severe general nervous symptoms were followed by wasting of the muscles of one shoulder. Recovery was complete. It was noted that in addition to the Weil-Felix reaction the Kahn test became positive and remained so for two months but there was no other evidence of syphilis.

DAWSON and BILLINGS (p 822) have investigated the serological reactions of persons infected with species of *Proteus* in general. These infections tend to cause agglutination in high titre of *Proteus* OLA but not of *P of s OLA*.

Indeterminate type Vector tick

TORRINGTON (p 145) produces evidence which disposes of the theory that Rocky Mountain fever is less virulent in the eastern than in the western States of the U.S.A. In both regions the strains of Rickettsiae may be mild or virulent whether judged by animal experiment or by the reaction of human beings to the disease. He (p 149) has isolated a strain of the Rickettsiae of Rocky Mountain fever from Wyoming which showed the lowest virulence of any yet studied. It gave complete cross immunity with highly virulent strains of the Rocky Mountain type but not with Rickettsiae of Q fever. The author suggests that the geographical classification into eastern and western types should be abandoned and that strains should be classified on their virulence to guinea-pigs. He states that there is no justification for the view that strains transmitted by *D. andersoni* are milder than those conveyed by *D. variabilis*. HUTTON (p 150) also notes that the case materialities of the eastern and western types of Rocky Mountain fever are practically equal.

PROTZ and WERTZ (p 680) describe their method of preparing an antigen of a suspension of Rickettsiae which they used for the complement fixation test in Rocky Mountain fever. This test gave positive results with sera from patients who were recovering or had recovered from that disease but not with sera from patients with other fevers including Brill's disease and Q fever or from normal persons. It therefore appears to be specific and should be valuable in differentiation. See also BEVERSON and TORRINGTON above.

LILLIE (p 149) contributes a careful description of the pathological findings in fatal cases of Rocky Mountain fever. These cannot be further summarized; they are essentially the same in man and in his monkeys.

BRUMPT and DESPORTES (p 829) have shown that the Rickettsiae of Rocky Mountain fever and of São Paulo fever may survive 44 and 5 years respectively in *Ornithodoros turicata*

PATINO CAMARGO (p 378) describe a new focus of tick borne typhus of the Rocky Mountain type in Tobia Colombia the previously known foci being in the United States and Canada and in Brazil The natural vector is *Amblyomma cayennense* but several species of Dermacentor and Ornithodoros from North and South America were proved to be potential vectors Sera from some of the patients showed protection against Rocky Mountain strains others did not The Weil Felix reaction was positive but not at high titre Further cross immunity investigations are in progress MANRIQUE & MONTOYA (p 615) have found a new focus of fever of the type of Rocky Mountain fever in Santander Colombia Cross immunity tests showed that the strains isolated were identical with those of Rocky Mountain fever and spotted fever of Tobia and São Paulo [Louse borne typhus also exists in Colombia see GROOT above]

TOSTES and BRETZ (p 453) have found spotted fever (of the tick borne type already known in Sao Paulo and Minas Geraes) in a rural area near Rio de Janeiro Blood from the patients gave scrotal reactions and appearances typical of Rocky Mountain fever when injected into guineapigs *Proteus OX19* was agglutinated in 5 of 6 cases to a moderate titre

DE MAGALHAES (p 828) discusses the epidemiology of this disease Although the chief vector is *Amblyomma cayennense* he suspects that the bedbug may be capable of transmission in nature as they have been proved to be experimentally Mosquitoes fleas lice and the tick *Boophilus annulatus* var *microplus* have been excluded as vectors He mentions the animal reservoir hosts DE MAGALHAES and MOREIRA (p 545) bring out certain important points in a description of the tick borne typhus of Minas Geraes The principal vector is believed to be *Amblyomma cayennense* [and it will be remembered that de Magalhães has previously shown that certain animals dogs opossums foxes bush rabbits and other rodents may act as reservoirs in nature] The present note is concerned chiefly with clinical appearances Mild ambulatory forms have been proved to occur but cases of average severity are common and grave forms which may show a great variety of forms are described In general the symptoms resemble those of Rocky Mountain fever

DE MAGALHAES (p 151) gives an account of the clinical laboratory findings in cases of the tick borne typhus of Minas Geraes The details cannot further be summarized The same author (p 152) writes of the value of inoculation of guineapigs with blood from the patients in positive cases the animals respond with typical fever and scrotal reaction and he claims that a negative animal test excludes this fever GEAR and DE MELLO (p 152) have proved hereditary transmission of the Rickettsia of S African tick bite fever in the tick *Haemaphysalis leachi* to the fourth generation They presume that hereditary transmission may continue indefinitely larvae nymphs and adults were infected and adults probably remain infected for long periods NEITZ *et al* (p 757) however point out that there has been little definite evidence to incriminate the ticks suspected of transmitting South African tick bite fever *Hyalomma aegyptium* has been proved a vector and *Haemaphysalis leachi* has been infected but the method commonly adopted of inoculating animals with the tissues of crushed

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ticks does not prove them to be vectors in nature. The author has shown that *Rhipicephalus* *s. aeneus* can transmit the disease naturally and that larvae bred from infective ticks are also infective. VIOLLE and JOULEUX (p. 379) have found Rickettsiae in the blood of rabbits and from *Rhipicephalus* *s. aeneus* infesting the rabbits in the region of Marseilles. Tests of these Rickettsiae were not conclusive but it is assumed that they were the Rickettsiae of boutonneuse fever. If this view is true it seems that wild rabbits as well as dogs may be a reservoir of the disease.

Q fever

FINDLAY (p. 380) has produced pneumonitis in mice by the intranasal instillation of suspensions of the spleens of mice infected with a description of the pulmonary changes is given. The condition was rarely fatal but otherwise was essentially the same as that induced by instillation of the Rickettsiae of classical and murine typhus. Rickettsiae were found in large numbers in the lung. The findings resembled those recorded in a fatal human laboratory infection with Q fever which occurred in Washington.

In describing the pathological effects of the Rickettsiae of Q fever in animals LILLIE (p. 548) notes that small foci are found in the lungs but that lesions in the brain and spinal cord are very infrequent. He contrasts this finding with the effects seen in classical typhus and Rocky Mountain fever infections of animals.

PERRIN and BRANTSON (p. 830) describe the pathology of Q fever in mice. They point out that mice the intranasal inoculation of normal yolk sac material into mice produce pneumonia in a proportion of instances the appearance of pneumonia after inoculation of suspected material is not in itself evidence of the presence of Rickettsiae.

Vaccination

DYER (p. 43) discusses vaccination against louse borne and flea borne typhus and gives a brief description of the methods of preparation used by the various workers.

COX (p. 381) gives full details of his method of preparing vaccines against various diseases of the typhus group. The Rickettsiae are grown in the yolk sac of hens' eggs and the vaccines are made from virulent strains which have been passed through 40-50 yolks with several transfers through guinea pigs. On death of the embryos the embryonic tissues are suspended in saline containing phenol and formalin and various centrifugation and dilution procedures are carried out. About 1 litre of this vaccine of killed Rickettsiae can be prepared from 200 eggs. Potency tests are carried out in guinea pigs. The vaccine has been issued for use in certain countries subject to epidemic typhus but its efficacy had not at the time this paper was written been fully assessed.

The Report of the Health Commission of the Rockefeller Foundation for 1940-41 (p. 140) contains an account of the outbreak of typhus in Spain. It is noted that the Cox vaccine was used on a fairly large scale and that the opinion held of it by the Madrid health officials was good but that it did not prevent the onset of mild typhus in five laboratory workers thought to be adequately protected.

GILDMEISTER and HAAGEN (p 681) have prepared vaccines by methods similar to those used by Cox but have not yet tested them in man. They point out that no vaccine can be expected to afford complete protection since that it is not always achieved even by an attack of the disease. They emphasize the risks to which laboratory workers are subjected and the measures of protection these persons should adopt. Details of the difficulties encountered in preparation of vaccines of *R mooseri* and *R prowazeki* are given; the method should be compared with that of Cox.

WOHLRAB (p 547) in discussing vaccination states that experiments with live vaccines have not produced practical results. Weigl's vaccine has proved its value in Poland and elsewhere and since the Cox vaccine has certain disadvantages the use of the Weigl method must be continued. He remarks that pooled convalescent serum has proved ineffective in Poland. HETSCH (p 548) gives his opinion of the Weigl and Cox vaccines in much the same sense.

FINDLAY (p 383) reports two cases in which injection of vaccines of epidemic typhus Rickettsiae failed to prevent infection with murine strains in persons working with those strains though in one case the attack was mild and was probably modified by the vaccination. He concludes that there is probably a close antigenic relationship between Rickettsiae of epidemic and murine typhus which is quantitative rather than qualitative. He reviews the various vaccines which have been used; the duration of immunity from killed vaccines is probably not more than one year. He notes that both Weigl's vaccine and the mouse lung vaccine lose much of their antigenic power after 5-6 months even when kept in the ice chest.

EYER *et al* (p 385) report 15 laboratory infections in persons engaged on preparation of Weigl's vaccine. All the patients had received one or more injections of the vaccine but in their work opportunities occurred for heavy infection either through the feeding of infected lice or the inhalation of infected louse faeces. In view of the heavy infecting doses these persons must have received the authors conclude that the vaccinations they had undergone had conferred a considerable degree of immunity; they also hold that the efficacy of the vaccine has been established by large scale trials in the field.

GEAR and DAVIS (p 750) show that gerbils of S Africa (*Tatera brantsi* and *T. afra*) are susceptible to louse flea and tick borne typhus and that after exposure of the animals to X ray and intra-peritoneal inoculation of infective material very rich growths of Rickettsiae are found. These are the animals of choice for obtaining large quantities of Rickettsiae. GEAR *et al* (p 830) have followed up this work by preparing vaccine of *R. prowazeki* from the peritoneum of irradiated gerbils by the Zinsler Castaneda method. Formal saline was used as the diluent. This vaccine produced immunity in animals; in man it produced slight local but no general reactions.

HUDSON (p 153) reports good homologous protection in animals after vaccination with a phenol killed Rickettsia obtained from the lungs of white rats infected with a Mexican strain according to the technique of Castañeda.

VEINTEMILLAS (p 153) discusses vaccination against the altiplanic (louse borne) typhus of Bolivia. He states that there is no cross immunity between this fever and Rocky Mountain fever [but compare CASTAÑEDA and SILVA above]. Blanc's live murine vaccine was not satisfactory but large doses of killed murine Rickettsiae prepared by

the Castaneda technique from the lungs of infected rats or white mice gave sound immunity in animals and man against the altiplanic strains. The author emphasizes that to secure good immunity the Rickettiae content of the vaccine must be high. The parent preparation contains over 100 million per cc. and two or three doses of 1-2 cc. of 1 in 10 dilutions are given at intervals of 1-2 weeks.

GIROUD and PANTHER (p. 753) have produced abundant supplies of the Rickettsia of louse-borne typhus by intranasal inoculation of mice with material from the exudate of the tunica vaginalis of infected guinea pigs. After repeated intraperitoneal passage of this strain in guinea pigs its virulence diminished. The same result was found after prolonged storage or refrigeration. Vaccination of animals with formalized suspensions of infected lung was successful and similar results were obtained with vaccines made from the lung of rabbits infected intranasally but only if the lungs contained Rickettsiae. The authors describe the morphology of the Rickettsiae; the only virulent forms are said to be those described as bacilliform.

DURAND *et al.* (p. 546) show that the Rickettsiae of Rocky Mountain fever when inoculated intratracheally into mice and rabbits gave rise to pulmonary consolidation with the abundant production of Rickettsiae if the strain used were fully virulent. If the strains were only moderately virulent the results were less striking and resembled those obtained with the Rickettsiae of classical typhus. DURAND and GIROUD (p. 546) have produced a vaccine from the lungs of animals infected intratracheally. The Rickettsiae are killed with formaldehyde and the vaccine produced a high degree of protection in guinea pigs.

Trench fever

JACOBI (p. 758) describes an outbreak of trench fever in the German army on its eastern front and gives in detail the signs and symptoms noted. No information is given as to the condition in which this outbreak occurred. It is noted that in the absence of serological tests there may be confusion with brucellosis.

PECHTEL (p. 386) reports a good result from the use of sulphapyridine in trench fever and PENA YANEZ (p. 386) writes of the value of tartar emetic in this disease.

Charles W. Loomis

MALARIA

SIEGFRIED (G.) & IZAC (R.) *Le paludisme dans l'annexe de Laghouat* [Malaria in Laghouat]—*Arch. Inst. Pasteur d'Algérie* 1940 Sept. Vol. 18 No. 3 pp. 279-294. With 1 map & 4 figs on 2 plates.

The Laghouat area, some 6,750 square miles in extent, about 250 miles due south of Algiers, along the southern foothills of the Atlas Mountains. Administratively it is part of the Ghardaia Military Territory. It is traversed from west to east by the Mzi Wadi, which contains water throughout the year in its western half; the eastern part of the wadi is generally dry except in time of flood. The population is 34,000 of whom 20,000 are nomad Arabs. The settled population are mostly found north of the Mzi Wadi where the climate is more

humid than in the southern part which forms part of the north Sahara. The town of Laghouat a fine oasis with 35 000 palm trees at the foot of the Atlas mountains and on the very edge of the desert is the administrative headquarters. It has a settled native population of 8 520. Malaria is very little in evidence in normal years anywhere in the Annex. Nomad Arabs may contract the disease elsewhere. Laghouat town has no endemic malaria. In other less important oases outbreaks have occurred but very infrequently. In 1939 there was an epidemic of *P. vivax* malaria of some intensity at Cherguia a small community numbering 100 on the left bank of the Mzi Wadi 12 miles from Laghouat. *Anopheles hispaniola* was found breeding in a spring but only very few larvae were taken. The year 1939 was characterized by exceptionally heavy rainfall throughout Algeria and malaria was abnormally prevalent.

Norman White

PARROT (L) CATANEI (A) & AUBIALET (R) Observations parasitologiques sur le paludisme en Algérie II Le paludisme épidémique [Parasitological Observations on Malaria in Algeria II Epidemic Malaria]—*Arch Inst Pasteur d'Algérie* 1940 Dec Vol 18 No 4 pp 402-440 With 12 diagrams [Refs in footnotes]

The observations reported concern a population of 789 people of an Arabic speaking white race living in the neighbourhood of Constantine. They are almost exclusively engaged in agriculture. The locality has long had an unenviable reputation for malaria. In 1934 the spleen index of children of 15 years and under was 80 per cent. The grassy banks of the Rhummel River and numerous canals and irrigation ditches afford breeding facilities in abundance for *P. maculipennis* var. *labranchiae*. During 1939 there was an excessive prevalence of malaria. Every member of the community was submitted to blood examinations twice a month from June to November and once in May and once in December. One blood smear and three thick drops were made at each examination. The results of the examination of this large mass of material are the basis of an extremely interesting and detailed report. Of the total population 39.6 per cent were found to harbour parasites. 27 per cent were infected with one species of parasite. 11 per cent with two and 1.2 per cent with three species. The parasite index was about three times greater for the age groups 15 and under than for adolescents and adults. Half the infants were infected during the first year of life. *P. falciparum* was the most prevalent species at all ages. Monthly variations of parasite indices were studied and use was made of a new plasmodiometric index. To establish this index the intensity of the infection is estimated. The blood examined is placed in one or other of the following 6 categories.

Category 1—parasites very rare in thick drops not more than 1 in a smear
 Category 2—parasites rare several parasites found in thick drops but less than 1 in 5 fields of the smear
 Category 3—parasites infrequent 1 parasite in 5 fields of the thick drop and in 20 fields of the smear
 Category 4—parasites numerous more than 1 in 5 fields of the thick drop 1 parasite in 10 fields of the smear
 Category 5—parasites very numerous at least 1 parasite in each field of the thick drop more than 1 parasite in 10 fields of the smear

Category 6—parasites extremely numerous several in each field of the smear
 Supposing in any given month 161 examinations of children 0 to 15 years of age gave 34 positive results divided thus —

Category	or coefficient	
5	1	
4	3	
3	5	
2	12	
1	11	

then the monthly intensity of malaria parasitism for this group would be —

$$(1 \times 5) + (3 \times 4) + (5 \times 3) + (12 \times 2) + (11 \times 1) = 75$$

$$34 = 2.2$$

The parasitological indices showed that *I. falciparum* was chiefly responsible for the epidemic outbreak and that premunition gives a much shorter and less effective protection against *P. falciparum* than it does against either *P. vivax* or *P. malaria*. It was also noted that the proportion of *falciparum* gametocyte carriers normally low in periods of low transmission increased considerably during the epidemic. The proportion of *P. vivax* and *P. malaria* aegametocyte carriers remained almost unchanged. Mixed infections became more numerous as the epidemic progressed.

COLLIGNON (E) Observations sur le comportement des anophèles en Algérie pendant l'année 1940 [Behaviour of Anopheles in Algeria during 1940]—Arch Int Past et Hyg 1941 June Vol 19 No 2 pp 265-272 With 8 figs on 4 plates

In contrast to the previous year rainfall in the spring of 1940 and in the preceding winter was markedly deficient. Surface collections of water were fewer than usual and rapidly disappeared. Marshy land were much restricted. The mild winter however gave anophelines a good start. Larvae of *A. bifasciatus* were taken February 27th, *A. albopictus* March 6th, *A. maculipes* March 7th and *A. stephensi* May 1st. *A. n. algeriensis* was found breeding throughout the malaria season and is the most widely diffused species. The last larvae of *A. bifasciatus* were found on May 30th. *A. albopictus* larvae could be found in certain restricted well shaded breeding places till the 3rd of August when the last specimen was taken. *A. n. algeriensis* was found breeding in the hills in March. It is of no malarial importance. The capture of adult anophelines was difficult in the spring, they became numerous in June but diminished almost to vanishing point in July under the influence of the season. The prevalence remained low.

COLLIGNON (E) La campagne antipaludique de 1940 dans le département d'Alger [Antimalaria Campaign in Algeria in 1940]—Arch Int Past et Hyg 1941 June Vol 19 No 2 pp 273-286 With 8 figs on 4 plates & 3 graphs

Malaria was mild in Algeria in 1940. The expected large number of relapses in the spring following a year of unusual malaria severity did not materialize. Primary infections were not numerous and cases of a

grave clinical type were confined to a few unhealthy localities. *P. vivax* was predominant throughout the year. The usual predominance of *P. falciparum* in late summer and early autumn was not observed. This was all due to a degree of Anopheles prevalence much lower than usual. The use of prophylactic quinine was confined to populations living in areas of high endemicity. Antilarval measures, the draining and tidying of water courses and oiling, were carried out in spite of difficulties in the recruitment of personnel arising from war conditions. Once again considerable use was made of Gambusia. In protected areas the improvement in health conditions was more marked than in other localities where the improvement was due solely to more favourable epidemiological conditions.

Norman White

BOULNOIS (J) Contribution à l'étude de la prémunition des noirs africains contre le paludisme algérien [Contribution to the Study of the Premunition of African Natives against Algerian Malaria]—*Arch Inst Pasteur d'Algérie* 1941 Mar Vol 19 No 1 pp 37-40

During 1939 a French battery, with a personnel of 134 of whom 40 were Algerian natives Arab or Berber and the remainder European, was quartered in the neighbourhood of Bone. Scarcely a single individual escaped one or more attacks of malaria. Alongside and in exactly comparable condition was a section of Senegalese troops; the men had been recruited in the Ivory Coast and in French Guinea. No antimalarial precautions of any kind were taken in spite of very great anopheline prevalence. Not a single case of malaria occurred among these Senegalese troops throughout the year though complaints about incessant attacks by mosquitoes were unceasing.

Norman White

CLASTRIER (J) Sur une épidémie de paludisme observée à Msila (Département de Constantine) [Malaria Epidemic at Msila Department of Constantine]—*Arch Inst Pasteur d'Algérie* 1942 Mar Vol 20 No 1 pp 15-32 With 8 plates & 2 figs

Msila is a small town of some importance lying astride the ksob Wadi midway between Bordj Bou Arreridj and Bou Saada. The native population is about 7 500; there are some 225 Europeans. Up to 1938 Msila had always been considered a healthy place. There had been very little malaria except for an outbreak of some severity during the war of 1914-18 when a detachment of Senegalese troops were stationed on the outskirts of the town. In 1938 and the two following years malaria cases were more numerous than usual but the death rates from all causes during these years were not abnormally high. In the autumn of 1941 following an epidemic of typhus an explosive outbreak of malaria occurred. Some 80 to 90 per cent of the population were attacked. Malarial coma and gastro-intestinal forms of the disease predominated. In October 1941 221 deaths were registered in Msila which is more than double the total deaths registered during the whole of 1940. The author of this report carried out an inquiry during the latter half of October. He found that 53 per cent of 717 persons of all ages had enlarged spleens; that 49.8 per cent of 387 persons harboured *P. falciparum*; 35.2 per cent *P. vivax* and that the parasite

index was 81.6. Gametocyte carriers were 68.7 per cent. of the persons examined. A series of recent floods had flushed the wadi just before the inquiry was carried out. Larvae of *A. Hispaniola* and of *A. maculipennis* were found in sheltered pools. The latter species alone was found in houses. A further survey in the spring will be necessary for the elaboration of an antimalaria programme.

A large part of the report is taken up with an admirably illustrated description of the wadi and many other less important anopheline breeding places, irrigation channels and ditches. Twelve kilometres upstream a dam has recently been constructed in the Ksob Wadi and was brought into service in February 1940. What part if any the dam played in bringing about an unusual propagation of anophelines it is not possible to determine on the evidence collected. Important factors contributing to the severity of the outbreak concerned the human population. There was marked undernourishment which was common to the whole of Algeria but accentuated locally by deficient harvests in two successive years. The outbreak coincided with the fast of Ramadan, a serious complication in an almost exclusively Mussulman population such as this. Food cannot be taken and no drugs can be given by mouth between sunrise and sunset. There was an insufficient supply of antimalarial drugs, especially of quinine in a form suitable for injection.

Vernon White

MESSERLIN (A). La lutte antipaludique au Maroc en 1941. [Anti-malaria Campaign in Morocco in 1941].—*Bull. Inst. Hyg. Maroc* 1941, N° 5, Vol. 1, pp. 133-145. With 1 plate.

Malaria in Morocco in 1941 was characterized by exceptional intensity comparable with that of 1929 and 1934. The distribution of the epidemic was unusual; its intensity was more or less inversely proportional to the degree of local endemicity. Rainfall in the winter and spring of 1940-41 was in marked excess of the normal. Owing to the spread of the disease to areas in which endemicity is low, the proportion of pernicious attacks was much higher than usual. The epidemic was at its worst along the coast between Mazagan and Safi and in the region of Settat and of Foucauld (Oulad Said). The anopheline season started early. Several instances are quoted of the remarkable distances anophelines travelled from the nearest possible breeding place. Thus Oualidia on the coast was invaded by female *Anopheles* from their breeding places which were certainly not less than eight to nine kilometres from the coast.

The organization of antimalaria work in Morocco underwent a great change at the end of 1940. Regional services of hygiene and epidemiology were created and now carry out antimalaria measures. The central antimalaria service has advisory functions only. Considerable difficulties were encountered. Petrol was scarce and many mobile malaria units had to rely on horse-drawn transport. The usual larvicides were unobtainable in sufficient quantity; use was made of calcium arsenite. Quinine was in short supply and had to be used with economy. On the whole the results obtained were fairly satisfactory. Most of the large towns and certain important rural centres that are protected by antilarval work were spared the epidemic. In contrast to this the town of Safi where no antilarval measures are taken owing to the normally very low *Anopheles* incidence suffered severely; the Safi Hospital treated 235 cases of malaria between July and October

whereas in previous years the total number of malaria cases treated by this hospital has varied from 30 to 60 a year. In certain selected areas the prophylactic administration of premaline (quinacrine praequine) was useful but the results were not as striking as those reported in previous years.

Norman White

DUREN (A) Notes preliminaires sur le paludisme endémique dans la partie Sud du Chenal et dans le Nord du Stanley Pool entre Black River et Kimpoko [Preliminary Notes concerning Endemic Malaria in the Southern Part of the Chenal and in the North of Stanley Pool between Black River and Kimpoko]—*Ann Soc Belge de Med Trop* 1942 Dec 31 Vol 22 No 4 pp 257-267

CHWETZ (J) BAUMANN (H) & FORT (M) Notes preliminaires sur le paludisme endémique sur les rives du Chenal du Congo entre Kwamouth et Black River [Preliminary Notes concerning Endemic Malaria on the Left Bank of the Congo between Kwamouth and Black River]—*Ibid* pp 269-294 With 1 fig

In a previous communication TROLLI reported on the results of the examination of thick drop preparations of the blood of all the inhabitants of the villages on the left bank of the Congo from Kwamouth to Stanley Pool that had been collected by VAN WYMEERSCH during the dry season June and July 1939 [this *Bulletin* 1943 Vol 40 p 213]. These two further reports deal with the examination of thick drop blood preparations of the same population collected during the rainy season January and February 1940.

Duren reports on the population of the southern part of this area which lies on the left bank of the Congo astride latitude 4° S at an altitude of from 300 to 400 metres. He examined 1 510 thick drop preparations parasites were found in 883 a parasite index of 58·7 per cent as compared with 45·56 the index reported by van Wymeersch for the same area. *P. falciparum* was found in 55·9 per cent of the preparations *P. inax* in 0·4 and *P. malariae* in 10·8 per cent. The percentages found by van Wymeersch were 44·7 0·0 and 3·11. Thus it would seem that the indices are higher in the rainy than in the dry season. Gametocytes were found in 24 per cent of the preparations. Trypanosomes were found in 13 preparations and microfilariae in 115. *Microfilaria perstans* appeared to be twice as prevalent as *Microfilaria diurna*.

Schwetz and his colleagues report on the northern part of the Chenal from Kwamouth to Black River. The preparations had been made 18 months previously and were consequently difficult to decolorize and to stain. In all 2 597 thick drop preparations were examined. The parasite indices for nearly all the villages were higher than those reported by van Wymeersch the global index being 56·3 as compared with 45·56 per cent. *P. falciparum* was found alone in 79·7 per cent of the positive preparations. *P. malariae* alone in 4 per cent and the two species in association in 15·3 per cent. In almost all cases parasites were very few in number. Gametocytes were found in 45 per cent of the positive preparations. Trypanosomes were found 13 times and microfilaria 147 times. The detailed results of the examination of the preparations from each of 19 villages are given in tabular form.

Norman White

MARTIN (Raymond) Le paludisme autochtone à Addis Abeba
[Indigenous Malaria in Addis Ababa]—*Arch Inst Pasteur*
d Afrique 194 Mar Vol 20 No 1 pp 10-14

The very considerable literature concerning malaria in Abyssinia that was forthcoming during the Italian occupation was almost unanimous in asserting that endemic malaria in that country was almost confined to altitudes below 1800 metres and that transmission never occurred above 2000 metres. The author considers that these altitude limits of endemic malaria are too low. In his capacity as medical officer of the Djibouti Addis Ababa Railway Company he frequently observed cases of malaria in which infection appeared to have been contracted at stations higher than 1800 metres and also at Addis Ababa which lies at an average height of 2500 metres. It was generally assumed that cases of malaria in Addis Ababa were caused by infections contracted during the journey there. The author instances four cases of malaria, three among the native population of the railway concession and one in the native personnel of the French Conulate, in all of which the infection was certainly contracted locally. One of these patients, a child of 5 years, had never left Addis Ababa and the other three had dwelt there persistently for at least 10 years. Three were *P. vivax* infections and one *P. falciparum*. It is clear then that malaria can be contracted in that city, but it is very difficult to assess the frequency of such locally acquired infections. Adult *An. gambiae* are frequently found in the railway concession of Addis Ababa all the year round in poultry runs and stables but rarely in human dwellings except in autumn or spring. They breed in the bed of the Habasha River from mid September to early November at the close of the rainy season but they never appear to breed in permanent collections of water. Many of the more important collections of water contain a curious batrachian *Xenopus elaeis*. This frog passes all its existence in water and the observation of the author shows that it is a voracious feeder on mosquito larvae. He never found mosquito larvae in collections of water which harboured this frog.

Norman White

DE MESQUITA (Bruno) Considerações sobre o impaludismo em Angola
[Malaria in Angola]—*Bol Geral de Med Bastora* 1942 July-
Sept. Se 24 Nos 7-9 pp 111-120

This paper gives the number of cases of the different clinical forms of malaria treated in each of the provinces of Angola during the three years 1938-1940 by age, sex and race and the malaria mortality among such cases. Seventy per cent of the total deaths in Angola occur outside the reach of medical assistance. Spleen and parasite indices of all the chief centres of population in the different provinces are listed. Indications for the identification of the chief malaria vectors are given: *An. gambiae*, *An. f. estivalis*, *An. paludis*, *An. pharoensis*, *An. pretoriensis*, *An. obscurus* and *An. oustanii*. The author offers some general remarks regarding the importance of malaria, summarizes the life-history of the malaria parasite and indicates in tabular form the distinguishing features of the four species of Plasmodia.

Norman White

CARR (H P) & HILL (R B) A Malaria Survey of Cuba — *Amer J Trop Med* 1942 Nov Vol 22 No 6 pp 587-607 With 1 fig [18 refs]

A comprehensive malaria survey of Cuba was carried out between 1936 and 1942. The results of the survey in the four Provinces of Oriente Pinar del Rio Camaguey and Havana have already been published [see this *Bulletin* 1940 Vol 37 p 664 and 1942 Vol 39 pp 513-515]. The present report relates to the island as a whole summarizes the information contained in the four reports referred to and adds similar information for the remaining two provinces Matanzas and Santa Clara. Interesting condensed information is given concerning the history geography geology climate and trade and commerce of the Island. Malaria is only mildly to moderately endemic in certain sections of Cuba large sections are free of the disease. Endemic areas are either near the coast or in the flat alluvial valleys of some of the rivers. The relative freedom from malaria of this tropical island is ascribed to the remarkable porosity of the soil on underlying limestone. Over 99 per cent of the enlarged spleens of children reached only to the costal margin or less over 92 per cent were palpable only on deep inspiration. It is doubtful whether such palpable spleens have much or any malarial significance. Epidemics of malaria do occur in Cuba 1900-01 1921 and 1934 were epidemic years. Small localized epidemics are of more frequent occurrence and are caused for the most part by man made anopheline breeding places. No naturally infected *A. albimanus* was found but this widely distributed species is almost certainly the chief vector. *A. crucians* is the only species that was found infected it prefers animal to human blood but is probably concerned at times in malaria transmission. *A. vestitipennis* can be infected experimentally and has a partiality for human blood it is a possible vector. Neither *A. grabhami* nor *A. atropos* are of malarial importance.

Norman White

ALBERTO ALVARADO (Carlos) Paludismo [Malaria] — *Bol Sanitario* Buenos Aires 1942 Apr-June Vol 6 Nos 4-6 pp 155-166

In the north east of Argentina malaria is endemic in the provinces of Jujuy Salta Tucuman Santiago del Estero Catamarca La Rioja Córdoba and San Juan. In the Litoral on the other hand epidemic malaria occurs from time to time with a cyclic periodicity of about 10 years. Epidemic malaria in this zone is an extension of the endemic malaria of Paraguay and of Matto Grosso in Brazil. Such extensions have usually been confined to areas near the river banks but the outbreak which began in 1939 along the Paraguay River exhibited greater diffusibility and cases of malaria were recorded 100 kilometres from the river. In the endemic area of the north east the maximum malaria incidence occurs in the early months of the year the important vector *A. pseudopunctipennis* is most prevalent from December to March. In the epidemic zone of the Litoral most malaria cases occur in June and July a possible explanation of this is the fact that *A. albicans* takes refuge in human dwellings after the close of the hot weather. In the endemic zone where the Director General of Malaria has control of the dispensaries there was a marked fall in the incidence of malaria in 1941 as compared with previous years. Cases of malaria

registered by the Service fell from 163 000 in 1940 to 134 000. Increased antimalaria activity was responsible for some of the decrease but it is thought that record low temperatures contributed to the decline. In controlled areas there was a much lower prevalence of *P. pseudopunctipennis* than in the previous year.

All three forms of the malaria parasite occur of the positive findings in the provinces of Jujuy, Salta and Tucuman. *P. vivax* was found in 68 per cent *P. malariae* in 13 *P. falciparum* in 17 and mixed infection in 15 per cent. In Catamarca and La Rioja *P. malariae* and *P. falciparum* together were responsible for only 10 per cent of the positive findings. It is noteworthy that *P. falciparum* infections are unusually mild in the Argentine, only one death was ascribed exclusively to malaria in 1941. *P. vivax* infections are most in evidence in the last and first months of the year. *P. falciparum* infections in the second quarter and *P. malariae* infections in the third quarter.

Of anophelines other than *A. pseudopunctipennis* which is much the most prevalent *A. stephensi* has been identified in Tucuman. *A. albipennis* occurs; it is possible that it is a different race from the *A. albipennis* of Panama and northern Brazil. The *A. taenioculatus* that has been reported is possibly a new variety or possibly *A. osuuldoi*. These are among the problems that are being studied.

Norman White

Godoy (Sylvia Garcia). A malária em São Luis, Maranhão [Malaria in S. Luiz].—*Folia Med.* 1942, Nov. 5, Vol. 23, No. 21, pp. 223-233.

S. Luiz in the State of Maranhão, Brazil, lies on the coast just south of the Equator. This paper contains a considerable amount of fragmentary information concerning the epidemiology of malaria among a poverty-stricken, parasite-ridden population living in conditions of squalor but the epidemiological picture is very incomplete. The topographical and meteorological conditions with very heavy rainfall most of which falls during the first six months of the year. The size of the population is not stated. Of the 1302 deaths recorded in 1938 51 were attributed to malaria. These figures for 1939 were 1257 and 40. Of 1467 positive blood films examined 936 contained *P. vivax*, 497 *P. falciparum* and 34 *P. malariae*. The spleen index of children of 10 years and under was 33 per cent. The three chief species of Anopheles found were *A. taenioculatus*, *A. albipennis* and *A. taenioculatus*. There is no information as to which is the chief vector nor as to the breeding places of the different species. Major drainage projects are recommended as the solution of the malaria problem.

Norman White

SIVILINGAM (V.). Seasonal Periodicity of Plasmodia of Malaria at Girdulla, Ceylon.—*I. d. M. d. G.* 1943, Mar. Vol. 78, No. 3, pp. 146-147. With 1 chart.

The author paid weekly visits to the outpatient department of the Girdulla Hospital, Ceylon, and made thick and thin blood smears of all patients being treated for malaria. This was done over a period of three years. The number of films examined was 3889. Malaria parasites were found in 196. The results of these examinations are

presented on a graph which shows the percentage incidence of each of the three species of *Plasmodium* in each month as well as the total number of sufferers from malaria attending the out patient department each month. When the incidence of malaria is low *P. malariae* is most in evidence 50 per cent or more of the positive findings. During seasonal or epidemic rises in malaria *P. falciparum* and *P. vivax* are much more in evidence the incidences of these two species fall and rise together. During epidemics *P. falciparum* is the dominant species. An increase in the percentage incidence of *P. falciparum* to 50 heralds a severe outbreak of malaria.

Norman White

THOMSON (R C Muirhead) Studies on the Behaviour of *Anopheles minimus* Part VII Further Studies on the Composition of the Water in Breeding Places and the Influence of Organic Pollution — *Jl Malaria Inst of India* 1942 Dec Vol 4 No 4 pp 595-610 With 3 figs on 2 plates

Previous experiments [see this *Bulletin* 1942 Vol 39 p 293] have shown that under laboratory conditions the female of *A. minimus* is deterred from oviposition by a very small degree of pollution and that larvae will develop normally in water far more heavily polluted than the female will accept for oviposition. In this paper the observations have been extended to the field to find out how the ovipositing female reacts to the kind of organic matter present in natural waters. By using a new analytical method (the oxygen absorbed from alkaline permanganate) some information has been obtained about qualitative differences in the organic matter. In general the results support the conclusions reached in the laboratory and it is suggested tentatively that the upper limiting values which will permit of oviposition are oxygen absorbed from acid permanganate (Tidy figure) in four hours at 40 C 60 parts per million oxygen absorbed from alkaline permanganate 12 parts per million albuminoid ammonia 10 part per million Degree of pollution * 80 and the ratio

$$\frac{\text{alkaline permanganate figure}}{\text{acid permanganate figure}}$$

must not be less than 2.0

In many stagnant rice fields and sometimes in tanks and borrowpits the water contains sufficient organic matter to account for the continuous absence of *A. minimus*. But this does not provide a complete explanation because there are many other ricefields and collections of stagnant water similarly avoided by *A. minimus* which have an organic content well within the range tolerated by the female mosquito. Females of *A. hyrcanus* and *A. vagus* will lay eggs in water with an organic content at least twice that of the maximum tolerated by *A. minimus*. Pools of water heavily shaded with Tarapat (a swamp plant used in the control of *A. minimus* by shading) present a special case. The organic content is well within the limits tolerated by *A. minimus*. Perhaps the very low oxygen content is the factor responsible for its absence perhaps it is a difference in quality of the organic matter which determines the behaviour of the mosquito.

V B Wigglesworth

This is an index derived from the empirical formula
 $(\text{albuminoid ammonia} \times 100) + (\text{Tidy figure} \times 10)$

THOMSON (R. C. Muirhead) Studies on the Behaviour of *Anopheles minimus* Part VIII The Naturalistic Control of *A. minimus* in Shallow Earth Wells — *Jl Malaria Inst of India* 1942 Dec Vol 4 No 4 pp 611-614 With 4 figs.

The female *A. minimus* will not lay egg in water fully exposed to sunlight. This fact has been made use of in order to control the breeding of this species in shallow kachcha well. Where these circular wells 5 to 6 feet in diameter with the water level 1 to 4 feet below the surface of the ground contain clean unpolluted water they may be a prolific source of *A. minimus* in the Assam valley. By removing all vegetation from the water edge and converting the vertical wall into smooth sloping ones almost perfect control is brought about without any interference with the water itself. I. B. H. Jesuorth

CLARKE (J. Laell) Studies of the Flight Range of Mosquitoes — *Jl Economic Entomology* 1943 Feb Vol 36 No 1 pp 121-122

It is a commonly accepted belief that male mosquitoes do not fly far from the breeding places. In order to test this belief and to gain more information about the range of flight of various species the author selected a flooded marsh in Illinois and studied the newly emerged mosquitoes on four successive days with different aniline dyes and then collected mosquitoes in New Jersey light trap station at varying distances from 1 to 14 miles away. Of 12,000 mosquitoes so far examined 2 carried gametocytes. *Aedes triseriatus*, *Culex pipiens* and *Culiseta inornata* were all recovered at 14 miles from the marsh the distance having been covered in 4-16 hours. On *Anopheles quadrimaculatus* was recovered at 8 miles on the second day, one *Anopheles punctipennis* at 7 miles and one at 10 miles on the seventh day. There was no apparent difference in the flight range of the male and female. (See also MESERLIN p 74.) I. B. H. Jesuorth

HICKLBT (Herbert S.) The Rate of Growth of *Anopheles quadrimaculatus* in relation to Temperature — *Jl Parasitology* 1943 Apr Vol 29 No 2 pp 107-113 With 3 figs.

On method used for describing the influence of temperature on the rate of development of an insect is to determine (usually by extrapolation from a graph) the lowest temperature at which development can occur (the developmental zero). The period required for development is then expressed as the total number of degree-hours or degree days above the developmental zero that are necessary for its completion. Over a certain range of temperature this value is often found to be fairly constant. The author has applied this method of temperature summation to the rate of growth of *A. quadrimaculatus*. The developmental zero is around 70°F and fairly constant values have been found for pupal and total development. Arguing that the big increase of *A. quadrimaculatus* in the spring represents the emergence of the second prime generation he suggests that these results might be used to predict the date of the occurrence. If the number of degrees in excess of 70°F are summed daily from the spring until the degree-day value reaches 530 that will indicate the date by which one generation can reach maturity. Interruption of the process will give the date

for the second generation. The author calculates that there should be 9 or 10 generations annually in northern Alabama.

I. B. Higglesworth

PETERS (Harold T.) Studies on the Biology of *Anopheles walkeri* Theobald (Diptera: Culicidae).—*Jl Parasitology* 1943 Apr Vol 29 No 2 pp 117-122 With 4 figs [10 refs.]

A. walkeri has been found to be very common in the Mississippi River Valley in South Eastern Minnesota. It differs from the other North American species of *Anopheles* in overwintering in the egg stage. Photographs are given of the small summer eggs and the larger winter eggs in which the floats are longer and a reticulated exochorion extends over the dorsal surface. These winter eggs remained viable even when kept moist at a temperature of -21°C for 72 hours. After exposure to -25° or -27°C the larvae failed to extricate themselves from the egg shell. The larvae were found chiefly among vegetation in water well exposed to light. They were largely eliminated by a fall in water level. Planned control based on this observation should prove efficient.

V. B. Higglesworth

ROY (D. N.) & GANGULI (S. K.) The Precipitin Test and the Production of Precipitating Sera.—*Indian Med Ga* 1943 Feb Vol 78 No 2 pp 81-89 With 4 figs [27 refs.]

This is a useful detailed account of the preparation of precipitating sera and of the manner of carrying out the precipitin test to determine the nature of the stomach content of blood sucking insects. The authors have found Belgian rabbits to be useful for the production of sera in India. The immunizing serum injections were made in the marginal vein of the rabbit's ear in fractional quantities 0.1 cc a day during the first week, 0.2 cc a day during the second week and 0.3 cc a day during the third week. During the third week the rabbit's blood is examined frequently to determine the precipitin titre. The serum of a good rabbit develops a fairly high titre in from 12 to 16 days and such a serum kept in a refrigerator retains its potency for a year. It was difficult to obtain a high titre serum in India in the hot weather. Much larger quantities of serum are obtainable by repeated cardiac puncture than by bleeding the rabbit to death. The authors describe their method of carrying out the precipitin test. The paper contains nothing very original but it should be of value to workers who are but little conversant with the technique.

Norman White

BIRKS (P. H.) Symptomatology of Malaria.—*Brit Med Jl* 1943 June 26 pp 784-785

The author has been in medical charge of a unit that has been heavily exposed to malaria in India. He has been impressed by the protean nature of the symptoms of malaria infection. In addition to the acute febrile forms of the disease including many cases with grave symptoms, very many patients have been seen with one or other of the following symptoms: pains in the back, rheumatic pains about joints, pain in the testicles, urticaria, multiple conjunctival ecchymoses, cardiac irregularity, recurrent diarrhoea and obstinate eczematoid conditions, all without fever. Brief notes are given of illustrative

cases. Thick drop blood preparations revealed malaria parasites in all cases and all the patients responded to a standard course of malaria treatment.

No man White

NIJOGI (A. K.) Complement Fixation of Human Serum in *Plasmodium vivax* Infection with *Plasmodium knowlesi* Antigen — *Ann Biochem & Experim Med* Calcutta, 1942 Vol 2 No 1 pp 51-54

Plasmodium knowlesi antigens were prepared by extracting the powdered dry spleen of a monkey which had died at the height of infection. The most satisfactory antigen was given by prolonged (1½ years) extraction of the powder at room temperature (21 C-23 C) with normal saline containing 0.5 per cent of phenol. The extracts were filtered through filter paper, the filtrates being used as antigens in varying dilutions. *P. vivax* infection in man gave positive complement fixation reactions.

C. M. H. White

COVELL (G.) Note on Economy in the Use of Anti Malarial Drugs — *Indan Med Gaz* 1942 Nov Vol 77 No 11 pp 643-646

The author refers to the controlled experiments carried out in many countries under the auspices of the Malaria Commission of the Health Organization of the League of Nations as set out in that Commission's Fourth General Report. These showed that the long continued administration of antimalarial drug when the disease is latent does no good and may be harmful and that short courses of treatment and moderate doses for primary attacks and relapses alike are sufficient to control the disease in most cases without undue interference in the acquisition of immunity. Economy in the use of quinine necessitated by the shortage of supply is the motive of the article which deals also with the merits and limitations of atabrin and plasmoquine.

The author refers also to the great importance of the spraying of adult mosquitoes as a measure of malaria control and expresses the opinion that the extension of pyrethrum cultivation in India is of even more importance for the future of malaria prevention than that of cinchona.

An editorial in the same issue of the *Gazette* is devoted to the austere course of quinine and the present shortage of antimalarial drug. In the criticisms directed at the Government of India's shortsighted policy in years gone by in not expanding their cinchona plantations a little less than justice is done. Attempts were made to extend plantations but great difficulty was met in finding suitable land for cinchona plantations. Experimental plantations in southern Burma from which much was hoped were not a success.]

No man White

HAMILTON (A. H.) A Preliminary Report on the Treatment and Prophylaxis of Malaria in Southeast Asia — *L.S. & Med B* 1943 Jan Vol 41 No 1 pp 67-72 With 1 fig

The author has had much experience of the treatment of malaria in the Netherland East Indies. A footnote states that in writing this paper free use has been made of the publications and teaching of NE

LANGEN formerly Professor of Medicine in Batavia For both treatment and clinical prophylaxis very decided preference is expressed for quinine as compared with synthetic remedies He considers atabrin and still more plasmoquine dangerous drugs to use [The toxicity of these drugs is overstressed] In the treatment of the acute attack 15 grains of quinine hydrochloride divided into two doses are given daily for a week relapses are treated in like manner For clinical prophylaxis the administration of 10 grains of quinine hydrochloride on each of two successive days each week is recommended The objections expressed to the prolonged administration of quinine in very large doses which was formerly advocated are likely to meet with universal approval
Norman White

BOYD (Mark F) On the Therapeutic Interruption of Artificially Induced Malaria Infections—*Amer J Trop Med* 1943 Jan Vol 23 No 1 pp 49-52

The author comments on the fact that artificially induced *P. vivax* infections are extremely sensitive to treatment and records the results obtained in 27 patients in whom it was necessary to terminate the infection All these patients had been infected by intravenous inoculation In four instances the administration of quinine in amounts ranging from 1 to 4 gm in single or divided doses apparently terminated the infections In one patient a single dose of 0.6 gm appeared to have had the same result That infection had been really eradicated in two of these patients was shown by the inoculation of large quantities of their estrated blood into susceptible individuals who remained free from any sign of infection One of these two had received as little as 2 gm of quinine Artificially induced *P. falciparum* infections behave otherwise recurrences occur after what is generally considered to be adequate quinine therapy Two striking examples are given
Norman White

AYALA (F) & BRAVO (G) Psicosis observadas en el tratamiento de la malaria con atepé [Psychosis observed in the treatment of Malaria with Atepé]—*Rev Clin Española* 1942 Oct 15 Vol 7 No 1 pp 70-72

This paper contains clinical notes of four cases of malaria in which severe mental disturbance was manifest during or immediately after treatment with Atepé [Atepé tablets each contain 0.1 gm atabrin and 0.005 gm plasmoquine the usual adult dose is three tablets a day for seven days see this *Bulletin* 1938 Vol 35 p 897] Such cases of mental disturbance seen by the authors can be grouped as follows (1) Cases of slight mental excitation in persons with no psychopathological taint the symptoms are ephemeral lasting three or four days or less (2) Cases of psychomotor excitation of more pronounced type than the last either mental exaltation or depression may be present After recovery these patients have no recollection of recent events In these cases also there is generally no previous history of mental disturbance (3) Cases of well-defined psychosis in patients with a psychopathological taint Two of the four cases described by the authors were of this nature

The frequency of such mental complications of atabrin therapy is very small including even the mildest manifestations of mental abnormality the total incidence does not exceed one per cent

Norman White

WHELEN (M) & SHUTE (P G) Thio-Bismol in Therapeutic Malaria —
Jl Trop Med & Hyg 1943 Feb-Mar Vol 46 No 1 pp
 1-5 With 3 charts

The results obtained by the administration of 0.2 gm of thio-bismol during the developed stage of therapeutic malarial fever to 19 patients confirm the findings of COLF DEOREO DRIVER JOHNSON and SCHWARTZ [this *Bulletin* 1941 Vol 35 p 178]. The drug is effective alike in infections by blood inoculation and infections by the bites of infective mosquitoes. Thio-bismol given in these conditions nearly always produces a remission of 48 hours which is followed by regular tertian fever. The drug appears to act on the parasites that are more than half grown. This selective action on alternate cycles appears to explain the transformation of remittent to tertian fever. It was the species of parasite used in all cases. Thio-bismol given during the incubation period did not affect the time of onset or the type of fever. The optimum time to administer thio-bismol is about the fourth day after the onset of the febrile attack. If given earlier the tertian fever may revert to quotidian fever before the patient has had the requisite number of attacks. The authors conclude that the drug has very definite value in therapeutic malaria.

Norman White

COVELL (G) Public Health Organization The Public Health Aspect of Malaria Control — *Indian Med Gaz* 1942 Dec Vol 77 No 12 pp 741-744

This article breaks no new ground but it serves a useful purpose in describing once more the organization necessary for the control of malaria in India. It is essential that there should be in each province of India an adequately staffed permanent malaria organization. The status and emoluments of the officers in charge should be comparable with those of an assistant director of public health and the subordinate staff should be adequately recompensed. The functions of these provincial malaria organizations are described and it is urged that their activities should be linked with those of the central malaria organization of the Government of India. Attention is called to the importance of instructing engineers, employers of labour and government officials in the elementary principles of antimalarial sanitation. Much is made of the very great importance of the spray killing of adult mosquitoes as a malaria control measure. It is the only antimalaria measure that is universally popular and it is the only measure which can produce an immediate effect on an epidemic of malaria. It is considerably cheaper than any antilarval measure. The extension of pyrethrum cultivation should receive active encouragement from all local governments where climatic and agricultural conditions for its cultivation are suitable.

Norman White

RUSSELL (Paul F) KNIFE (Fred W) & RAO (H Ramanatha) On Agricultural Malaria and its Control with Special Reference to South India — *Indian Med Ga* 1942 Dec Vol 77 No 12 pp 744-754 [31 refs]

There are many ways in which malaria and agriculture react on each other in India. Malaria may retard agricultural development and may even force the abandonment of large tracts of agricultural land. Malaria is the cause of much suffering and great expenditure on plantations of tea, coffee, rubber, pepper and cardamoms. Malaria is a severe handicap in the exploitation of forest resources. Irrigation is an urgent problem as is man made malaria generally. The more extensive and intensive the agricultural practice the less intense and extensive may malaria become. Examples are given of all these reactions between malaria and agriculture. Most space is devoted to the problems related to irrigation malaria. Readers who are conversant with the authors numerous reports on the malarial conditions in the Pattukkottai taluk of the Tanjore District of South India will find little that is new in this interesting summary. The spray killing of adult mosquitoes is effective and can be carried out in many small villages for an over all cost not exceeding a quarter of a rupee per head per year. Control by antilarval measures involves a certain initial outlay but maintenance costs have been reduced in some cases to less than two annas per head per year.

Norman White

MESSERLIN (A) Note sur l'emploi de l'arsenite de calcium comme poudre larvicide dans la lutte antipaludique [The Use of Calcium Arsenite as a Larvicide in Antimalaria Work] — *Bull Inst Hyg Maroc* 1941 NS Vol 1 pp 69-78

Economie and other conditions made it difficult to obtain oil for antilarval measures in Morocco and the manufacture of Paris green was suspended in France owing to the insufficient copper supply. Such circumstances prompted the search for another effective larvicide. This paper describes laboratory experiments with arsenate of lead, arsenate of cobalt and arsenite of calcium. The arsenates were of little value as larvicides but calcium arsenite gave results but little inferior to those with Paris green. Field experiments confirmed the value of calcium arsenite which has since been used on a large scale. It is being used in exactly the same manner as was Paris green and in the same dilution. Powdered marble is used as a diluent. It appears to be as effective as was Paris green.

Norman White

BOLTEN (Joseph) The Prevention of Malaria among the Military Forces in Puerto Rico — *Bol Asoc Med de Puerto Rico* 1943 Mar Vol 35 No 3 pp 89-96

Malaria is a serious problem for the military authorities in Porto Rico. In 1941 the annual malaria case rate among the forces stationed there varied between 40 and 85 per thousand per month between January and July, rose to 180 in August and remained between 100 and 150 for the rest of the year. During the first half of 1942 the incidence was double that of the previous year, thereafter it declined to about half the 1941 rates. This paper describes the intensive measures that are being taken to combat the disease.

Treatment—Absolute rest in bed is necessary. Transport of the patient should be avoided if possible. Much fluid should be drunk in order to dilute the urine. Sodium citrate is given by mouth or intravenously to make the urine alkaline. By mouth an initial dose of 120 grains is followed by 60 grains 2 or 3 hourly until the urine is alkaline and the dose is then adjusted to maintain the alkalinity. Intravenously 120 cc. of 3.8 per cent solution is given or instead of sodium citrate 20 cc. of a mixture of equal parts of a saturated solution of sodium bicarbonate and a 3 M solution of sodium lactate. Intravenous injections should be given very slowly. It is important to measure the fluid intake and output. Blood transfusion is needed if the anaemia is very severe. About a week or ten days after haemolysis has ceased mepacrine or quinine should be given to prevent a malarial relapse. Quinine is given in gradually increasing doses three times a day beginning with $\frac{1}{2}$ grain and increasing up to 10 grains but if haemolysis returns the quinine must be discontinued.

A person who has had an attack of blackwater fever should take care to avoid further attacks of malaria. If an attack occurs it is thought wiser to treat it with mepacrine than with quinine.

J. F. Coombs

TRYPANOSOMIASIS

1. **GOUDSEHOVEN (C.) & SCHOENAEERS (F.)** L'isolement des trypanosomes par centrifugation fractionnée du sang [Isolation of Trypanosomes by Fractional Centrifugation of Blood]—*Ann. Soc. Bel. le Med. Trop.* 1942 Sept 30 Vol 22 No 3 pp 213-222

After trying several procedures for isolating and concentrating blood trypanosomes for the diagnosis of light infections and for the preparation of antigen for complement fixation test the authors adopted the following method for the preparation of *quadrin* antigen. The blood of infected white rats is mixed with twice its volume of citrated saline and centrifuged for five minutes at 7000 r.p.m. The deposit is suspended in normal saline and centrifuged for 10 minutes at 1000-1200 r.p.m. The supernatant liquid is mixed with most of the white upper layer of the deposit and again centrifuged for 10 minutes at 1000-1200 r.p.m. and this is repeated twice. Finally the suspension is centrifuged twice for five minutes at 7000 r.p.m. The deposit is then mixed with twice its volume of equal parts of normal saline and glycerine.

J. F. Corson

2. **AUGUSTE (Donald L.)** Some Factors in the Defense Mechanism against Reinfection with *Trypanosoma lewisi*—Reprinted from *Proceedings of the Society for Experimental Biology* 1943 May Vol 7 No 3 pp 82-93 With 1 plate 10 refs.

Some years ago TALIAFERRO demonstrated that the mechanism of immunity acquired by rats infected with *Trypanosoma lewisi* involves the participation of two antibodies. One of these antibodies inhibits the reproduction of the trypanosomes leaving in the blood only non-reproducing forms, the other which appears on the scene later

has a trypanocidal effect causing the disappearance of the adult forms and terminating the infection in rats which then become refractory to reinfection [See this *bulletin* 1933 Vol 30 p 122 1939 Vol 36 p 214 1940 Vol 37 p 407]

The present paper is devoted to a study of the defence mechanism against reinfection regarding which very little is known. It was formerly thought that in rats spontaneously recovered from a previous infection trypanosomes introduced intraperitoneally were prevented from penetrating into the circulation by the lymph nodes which formed an effective barrier. However the author has demonstrated in experimental reinfections of rats that trypanosomes inoculated by this route passed without hindrance through the lymph nodes and appeared in the blood stream. Here they remain for a short time only and can be recovered from the blood for periods varying from a few minutes to several (4-5) days in the course of which they may manifest signs of multiplication. During their sojourn in the blood the trypanosomes (irrespective of whether they had been introduced as adult or dividing forms intraperitoneally or directly into the heart) are sensitized by trypanocidal antibodies which immobilize and agglutinate them with the result that they are either destroyed in the circulating blood by macrophages or they are mechanically filtered out and disposed of in the liver and probably also in the spleen.

The mechanism of defence against reinfection appears to be fundamentally different from that in initial infections since in the former case the reproductive activity of the trypanosomes is not inhibited and ablastin therefore does not appear to play any role. The author attributes the phenomena described to a single trypanocidal antibody though he does not entirely exclude the possibility of two distinct ones (one an opsonin the other an agglutinin) being involved.

C A Hoare

OTÁLORA (B) Enfermedad de Chagas en Colombia [Chagas Disease in Colombia]—*Rev de Higiene* Bogota 1942 Feb & Mar Vol 23 Nos 2 & 3 pp 19-30

In 1929 Dr PIEDRAHITA recorded finding in Colombia *Rhodnius prolixus* infected with *T. cruzi*. Several hundreds of these insects have now been examined and 31.4 per cent of the adults and 6.7 of the larvae and nymphs have been found positive. The difference is accounted for by the fact that the unwinged nymph and larva have but a limited range to suck blood. In July [? 1941] 358 serodiagnostic tests were made near Cundamarca of persons living in huts heavily infested with the bug and of those in the vicinity and blood was taken from 49 domestic animals. Previously the test had been made on 26 unselected children in the same region and 39 in other Departments with a negative result. In July 270 blood samples were taken nearly all from children and also from 31 dogs and 18 cats. In August the test was carried out on six children and on 35 others in the neighbourhood also on 10 dogs and five cats. The six children proved to be positive and three others later—a child of three years another of eight years and a woman of 20 years. Again in August the test was made on 36 children of school age and under in a municipality of Guateque (Boyaca) where *Rhodnius* abounds and two were positive. [The statements detailed are very mixed and difficult to unravel.]

Of 312 venodiagnostic tests 13 were positive. All the patients were apyretic and direct blood examination had revealed nothing. Brief details are given of ten children ranging in age from 2 to 11 years.

It follows from the author's record that Chagas's disease is present in Colombia and its incidence is fairly high especially among the poorer inhabitants. The venodiagnostic test is not difficult to carry out and is the most reliable [nothing is said of the Machado reaction]. He advises further study of the proportional infection of the local *R. duvidae* and of possible animal reservoir hosts.

H. Harold Scott

GASIO (G.) & CAPRAJAL (V.). Clínica y epidemiología de la enfermedad de Chagas en Chile. 'Chagas's Disease in Chile. Symptomatology and Epidemiology'—*Acta Med. de Chile* 1941 Dec Vol 69 No 12 pp 818-833. With 18 fig. (2nd rel.)

The clinical part of this article is based on 58 cases under the authors' observation. Of these 11 were acute, 42 subacute and five chronic. Of the first two were in infancy (under five months of age), four were between 5 and 10 years, three were adolescents (13-20 years) and two were adults. Nine had unilateral palpebral oedema and two had generalized oedema secondarily, ten had tachycardia, one bradycardia. The Machado reaction was positive in seven, negative in two (at an early period) in one. *T. cruzi* was seen in the blood. Bayer 7602 was used in treatment in doses of 10-60 mgm per kilo repeated at weekly intervals if the Machado reaction remained positive.

Of the 42 subacute cases one was in early infancy, 14 in second infancy (? 5-10 years), 20 in third infancy (? adolescence) and 7 were adults. 29 were males, 13 were females but it must be borne in mind that more children than adults were examined and more male than females.

Tachycardia was present in 34, generalized adenopathy in 41, hepatomegaly in 29 and splenomegaly in twenty. Bayer 7602 was given but was ineffectual at least in the doses used. It seemed merely to reactivate the parasite and increase the number seen in the blood.

In the chronic stage diagnosis is very difficult. Four of the five were in hospital, three were confirmed by venodiagnosis and one by a repeatedly positive Machado reaction. All five were adults between 40 and 60 years old.

From the epidemiological aspect the authors studied (1) *The virulence of T. cruzi for man in the area*. It is to be noted that the disease is less severe on the Pacific than on the Atlantic side of this part of S. America. The author postulates that the transmitter, *Triatoma* *jeffersoni*, has extended much longer on the Pacific side and that inhabitants have acquired some immunity, further on the Atlantic side constant influx of European and others brings ever fresh non-immunes to the country. (2) *The transmitter*. Thus is *Triatoma* *jeffersoni* and of 9,000 specimens examined 40 per cent were carrying *T. cruzi*. (3) *Reservoir hosts*. The chief are dog and cat. Of 184 dogs 20.4 per cent were positive and 4.4 per cent of 136 cats. (4) *Incidence in man*. Of 28 sera of persons in the northern rural area tested 222 (30.4 per cent) were positive to the Machado reaction, of 406 in the rural part of Santiago Province 158 (31.5 per cent) or together 380 out of 1,134 (30.8 per cent). Of 419 hospital patients 40 (9.5 per cent)

were positive That is altogether 390 out of 1 553 (25.1 per cent)
(c) *The Fatality Rate* This could not be determined on the data available

[There is a sketch map with indices of the numbers of *Triatoma* examined in the different districts and the numbers found harbouring the parasite This would be most instructive and useful but unfortunately is on so reduced a scale and so poorly reproduced that most of it is illegible even with the aid of a lens]

H Harold Scott

ALVAREZ (J) & CARVAJAL (V) *Tripanosomosis cardiaca americana*
Investigacion clinica } electrocardiografica Comunicacion
preliminar 'Cardiac Conditions In Chagas's Disease'—*Rev Med de*
Chile 1941 Dec Vol 69 No 12 pp 833-840 With 7 figs [12
refs]

This is a preliminary communication which is so detailed yet so compressed that it cannot be abstracted Those interested should consult the original Four cases are given in detail together with a number of electrocardiograms but too reduced to be of use in interpretation Of five acute cases referred to all had sinus arrhythmia two with tachycardia two with normal frequency and one with bradycardia In the earlier stages of observation later with normal frequency Of twenty subacute cases cardiac disturbances were studied in 14 three had sinus arrhythmia five arrhythmia with tachycardia five tachycardia of sinus origin and one bradycardia The relevant details of thirty patients are presented in a large table

H Harold Scott

VIANA MARTINS (A) & MACEDO (E) *Nota sobre a molestia de Chagas na Bolivia* [A Note on Chagas's Disease In Bolivia]—*Brasil Medico* 1942 Vol 56 No 33 pp 392-393
MAZZA (S) *Consideraciones sobre la enfermedad de Chagas en Bolivia* [Remarks on Chagas's Disease in Bolivia]—*Prensa Med Argentina* 1942 Vol 29 No 51 Reprint 15 pp [Summary taken from *Rev Applied Entom* Ser B 1943 June Vol 31 Pt 6 p 111]

The authors of the first paper state that the only record known to them of infection of any *Triatomid* in Bolivia by *Trypanosoma* (*Schizotrypanum*) *cruzi* is that of Neiva in 1916 who found that almost all of a batch of *Triatoma infestans* Klug taken in the Department of Potosi were naturally infected Their own observations showed infection in 5 of 6 males all of 6 females and 6 of 10 nymphs of *T. infestans* taken in a locality in south western Bolivia

The author of the second paper points out that he himself in 1937 recorded natural infection of *T. infestans* by *Trypanosoma cruzi* in various parts of Bolivia 35 per cent of the bugs were infected at about 12 000 ft and 66 per cent at about 9 000 ft He gives further records of natural infection of *Triatoma infestans* and states that *T. (Eutriatoma) sordida* Stål (the eggs of which were parasitised by a species of *Telenomus*) and a single individual of *T. (E.) oswaldoi* Neiva & Pinto were also observed to be infected *Psammolestes coreodes* Bergr taken in birds nests was not

LEISHMANIASIS

NIYOGI (A. K.) & RAY (J. C.) Complement Fixation Test in Kala Azar—*Ann Biochem & Experim Med* Calcutta 1942 Vol 2 No 1 pp 47-50

After renewing the attempts which have been made to prepare anti-ens which will give reliable complement fixation tests for kala azar the authors show that the results so far obtained are unsatisfactory. They in their turn have prepared anti-ens from washed flagellates from 48-hour cultures of *Leishmania donovani* which in the tests so far carried out have proved reliable. The flagellates are washed in distilled water or normal saline and brought to a strength of 60 million organisms per cc. The suspensions are subjected to 48 hours shaking in a machine. If distilled water has been used the anti-ens is made isotonic by the addition of sodium chloride. The anti-ens is preserved in the refrigerator. With pooled guinea-pig serum for complement and sheep's red blood corpuscles and haemolytic sera prepared in rabbits complement fixation tests were carried out on 10 cases of kala azar and a number of cases of other diseases including two of dermal leishmaniasis. Positive reactions were obtained in all the kala azar cases but not in any of the others. C. M. Henyon

PESSÔA (S. B.) & COUTINHO (J. O.) Infecção natural e experimental dos flebotomos pela *Leishmania brasiliensis* no Estado de São Paulo [Natural and Experimental Infection of Phlebotomus by *L. brasiliensis* in the State of São Paulo]—*Hospital* 1941 Vol 20 No 1 pp 25-35 [Summary taken from *Rev. Applied Entom. Ser. B* 1943 June Vol 31 Pt 6 p 111]

Of 9,273 sandflies (*Phlebotomus*) collected in infected zones of the State of São Paulo, Brazil, 21 harboured *Leishmania brasiliensis*. It was found predominantly from September to February in *P. m. onei* França, *P. pessoai* Coutinho and Barretto and *P. whitmani* Artunes and Coutinho. *P. whitmani* and *P. fischeri* Pinto were experimentally infected by feeding on *Leishmania* nodules of monkeys; the forms of the parasite in them were identical with those in naturally infected sandflies.

FEVERS OF THE TYPHUS GROUP

MCCARTHY (D. F.) Notes on an Outbreak of Typhus Fever—*Med Officer* 1943 June 26 Vol 69 No 26 pp 205-206

This is an instructive report of an outbreak of louse-borne typhus fever.

During March and April 1942 five persons living in a house in Westport, Co. Mayo, were attacked by what was supposed to be influenza. Typhus was not suspected till 7th May, when a member of the family who had lived in the house for a fortnight in April and who was being treated for suspected typhoid showed symptoms suggestive of typhus. His Weil-Felix reaction was found to be positive and he died two days

later Another resident in the house was attacked by typhus on 15th May and a nurse who had attended one of the earlier patients in hospital was attacked on 16th May A case occurred on 17th May in another house to which two of the persons already infected in the original focus had moved on 2nd May just before they fell ill Altogether there were nine cases of which three were fatal in five the Weil Felix reaction was positive in titres ranging from 1-25 to 1-5 000 in the other four the test was not carried out Two of the cases treated in hospital are described these were typical examples of severe typhus fever

There had been no known case of the disease in Co Mayo during the previous nine years but later investigation showed that many persons in the affected locality had positive Weil Felix reactions the titre being 1-25 The author suggests that typhus fever must have persisted in the area in mild endemic form giving rise to attacks which were mistaken for such diseases as influenza John W D Megaw

SIKORA (Hilda) Zur Morphologie der Rickettsien [The Morphology of the Rickettsiae]—*Ztschr f Hyg u Infektionskr* 1942 Nov 9 Vol 124 No 3/4 pp 250-270 With 1 coloured folding plate & 3 figs [39 refs]

This paper which is fully illustrated by plain and coloured drawings contains the results of a prolonged and careful study of various Rickettsiae and allied organisms The stain employed was Giemsa's three drops were diluted in 20 cc distilled water and applied for 24 to 48 hours More recently the author has used the ordinary dilution of one drop in 10 cc of distilled water but no alkali was added and the stain was allowed to act for six hours By these methods the organisms were stained red throughout and it is claimed that a blue colour in the bacillary forms is due to insufficient staining All the drawings are further enlarged to 3 000 diameters and the illustrations The various forms described are regarded as corresponding to different stages in the growth and multiplication of the organisms These stages normally are —(1) rounded or oval non cellular granular forms each of which elongates and becomes (2) a short rod shaped or barrel shaped cellular body with a granule at each end Exceptionally these bodies divide directly and give rise to two granules but the normal development is further elongation and subdivision of the granules with the production of (3) bacilliiform bodies with three or four granules in each Each bacilliiform body then divides into (4) two plump bodies each of which has two polar granules These bodies elongate become slender and then (5) dumb-bell shaped With the disappearance of the intermediate substance between the granules the cycle is complete and four daughter granules are produced from the parent granular form

Similar stages of development occur in the organism of fowl cholera which is regarded by the author as forming a connecting link with true bacteria

The existing definitions of Rickettsiae are not satisfactory because some of these organisms are not intracellular in their habitat and some can grow in cell free culture media The author's definition is based on morphological characters it is Microorganisms which

even in favourable environmental conditions maintain a granular form and become bacilliform only during the period of multiplication.

[The author claims that her observations made at magnifications of 3 000 have revealed details of structure which could not be seen by WOLBACH and others with magnifications of about 1 500. This claim is open to criticism because all expert microscopists agree that the finest existing objectives will not yield true images when the magnification exceeds 1 500 diameters. Changes in the appearance of the image resulting from higher magnifications are likely to be due to diffraction and interference effects and therefore to bear no relationship to the true structure of the object.]

The advantage claimed for intensive staining is also questionable.

Further light on the morphology of the Rickettsiae can only be expected from the employment of the electron microscope which yields true images at far higher magnifications than are available with the ordinary microscope. Plotz and his colleagues since the appearance of the present article have made an important advance in the knowledge of the structure of the Rickettsiae with the help of the electron microscope [see this *Bulletin* 1943 Vol. 40 p. 68.]

John W. D. Meade

GIFOLD (P.) & PANTIER (R.) L'évolution des rickettsies des fièvres érythémateuses et fonction de leur végétation dans les tumeurs qu'elles parasitent [Differences in the Structural Forms of the Typhus Rickettsiae are associated with Differences in the Vital Activities of these Organisms in the Tissues in which they are Parasites]—*Bull. Soc. Path. Exot.* 1942 Jan. 14 & Feb. 11 Vol. 35 Nos. 1-2 pp. 6-8 With 4 figs. on 1 plate

A literal translation of the title of this paper would not convey a true impression of the meaning of the authors whose main contention is that each structural phase of the Rickettsia represents the result of a special type of reaction of the host to the invading parasite. The authors have already expressed very similar views [see this *Bulletin* 1942 Vol. 39 pp. 753-754].

The bacilliform Rickettsiae are the actively reproducing and highly pathogenic form; they are strongly antigenic but at the same time they offer little resistance to adverse influences.

Granular clumps of Rickettsiae are formed when the host is putting up resistance to the organisms. Homogeneous bodies are formed when the host has overpowered the Rickettsiae and caused them to lose their structural identity. Granular forms either isolated or in clumps are found in the organs of animals in which the Rickettsiae are adapting themselves to their hosts. These granules can give rise to bacilliform Rickettsiae when infective material in which they are contained is passed through an animal.

John W. D. Meade

ABRIKOV (A. I.) Pathological Anatomy of Typhus Fever.—*Sovetskaya Meditsina* Vol. 23-24 pp. 8-11 In Russian. Kazan 1941

In this concise and lucid account of the pathological anatomy of typhus fever the disease is characterized as a generalized acute

infectious angutis all the clinical symptoms being attributable to changes in the vessels especially the arterioles and capillaries. The main vascular lesions are represented by (1) necrosis and destruction of the walls (2) thrombosis and (3) cellular proliferation both in the walls and around them. Angutis most frequently assumes one of the following types (a) verrucose endoangutis (b) proliferative destructive thromboangutis (c) proliferative angutis and (d) necrotic angutis.

The author further discusses the pathogenesis of the changes in the arteriolo capillary system in typhus fever regarding which opinions differ. He believes that these changes are brought about both by the rickettsiae penetrating into the endothelium of the vessels and by allergic sensitization of the latter. The vascular changes are found in all organs and tissues and especially the brain where they give rise to a specific form of encephalitis. Amongst other tissues affected are mentioned the sympathetic and intervertebral ganglia the suprarenals testicles cardiac and voluntary muscles.

It has been demonstrated that during convalescence the nodular granulomata in the brain and other organs (proliferative angutis) disappear entirely. This is because the proliferated cells degenerate and are absorbed after which the normal structure of the vascular walls is re-established.

The post mortem diagnosis of typhus fever may present some difficulties. In such cases microscopical preparations of the medulla—showing the characteristic granulomata—are of great value. In addition to these the Weil-Felix test can be made with serum obtained from the corpse.

C. A. Hoare

RIZOV (A. A.) [Subterranean Chambers for the Fight against Typhus Fever in the Village]—*Sovietskaja Medicina* [=Soviet Medicine] Kazan 1941 Nos 23-24 pp 30-31 With 1 fig. [In Russian.]

The author describes a simple type of delousing chamber which can be built rapidly and at low cost under rural conditions. A hut made of wattle-and-daub or other suitable material and measuring 7 by 2.75 metres with a height of 2 metres is constructed inside a rectangular pit excavated in the ground. The space between the walls of the hut and those of the pit is filled up with sawdust dry leaves or other material. The roof of the hut (13.5 cm thick) is covered first with a 10 cm layer of clay then with 60-80 cm of straw rushes or branches. This is covered with 50 cm of earth with a layer of turf on the top. The floor is made of beaten clay.

The hut is divided by two partitions into three compartments. It has a small window in the roof and two others in the doors leading into and out of the central compartment which represents the delousing chamber. Contaminated clothing is brought through an outside door into a compartment at one end of the hut thence into the central chamber where the various articles are suspended from hooks in the ceiling. The central chamber is heated by two iron stoves placed at opposite ends and provided with exit pipes running through the roof. Delousing takes place at 80-100 C during 25-30 minutes which is sufficient to destroy both the lice and the nits. The clothing is then removed into the third (clean) compartment which has an independent exit.

This type of chamber can be constructed in three or four days and it has been recommended for general use by the Chief State Sanitary Inspectorate of U.S.S.R. C. A. Hoare

PICHAN Neues ueber Fleckfieberforschung Zur Eroeffnung der Fleckfieberforschungsstätte (Behring Institut) in Lemberg {A Survey of Recent Typhus Fever Research}—*Deut. Med. Woch.* 1943 Feb 19 Vol 69 No 7 pp 158-160

This is a brief report of proceedings connected with the opening of the Lemberg Typhus Research Institute in December 1942.

Various aspects of recent work on typhus fever were discussed by German experts. Considering the exceptional opportunities that have been available for the Reich workers surprisingly few advances in connexion with the disease were reported.

GILDEMEISTER referred to the egg yolk vaccine prepared by himself and **HAAGEN** at the Robert Koch Institute thus in all essential respects like the Cox vaccine but no reference is made to the originator of the method. The vaccine is regarded as being of special value in reducing the severity of the attacks but louse control is admitted to be the best defence against the disease.

ROSE also stressed the importance of louse disinfection. He said that isolated cases in a louse free community could never give rise to outbreak of the disease. He regarded dry heat as the best method of disinfection and referred to small portable hot air apparatus as being a notable advance. The so-called louse powders were not considered so satisfactory as the impregnation of clothing with substances which destroy lice without damaging the wearer.

EYER dealt with serological diagnosis in field conditions. He praised the Cracow preparation which consists of dried cultures of *Proteus OX19*. He stated that a drop of finger blood was quite enough for the Weil-Felix test and that rapid bedside diagnostic tests were very helpful in field conditions.

KUHN discussed chemotherapy. He said that the chemical structure of chemotherapeutic substances was often of minor importance and mentioned 4-4-diaminobenzol as an example of a sulphur free drug which might be found to have a stronger sulphonamide effect than the sulphonamides themselves.

MRIKOWSKI spoke of the possibility of predicting epidemic of typhus by a study of the periodic cycle of occurrence of severe outbreaks. He mentioned the examples of typhoid fever and diphtheria which have a thirty year periodicity and scarlet fever which has its peak of incidence at eleven year intervals.

SCHMIDT spoke of recent advances in the concentration of antibody in general by electrophoresis and by an enzymatic process by which a serum containing 1 000 units per cc. can be purified and concentrated so as to contain 80 000 units. The ideal aimed at is to obtain a pure crystalline antitoxin free from all the albuminous substances.

HAAS dealt with the need for further light on the relationship between the chemical structure and the specific action of each antigen and said that the pneumococcus antigen had already been prepared synthetically.

WOHLRAB referred to the close relation between the Rickettsiae of typhus and trench fever.

Joh. H. D. Meaurio

ALICATA (J E) & BRENNIS (Virginia) Typhus Fever in Honolulu
certain Epidemiologic Aspects—*Hawaii Med J* 1942 Nov—
Dec Vol 2 p 59 [Summary taken from *J Amer Med Assoc*
1943 May 22 Vol 122 No 4 p 257]

Alicata and Brennis state that a strain of local human typhus has been found to be clinically and immunologically identical with that of the local rat and Wilmington strains of endemic typhus. Typhus developed in 73 of 249 guinea pigs inoculated with the brain emulsion of 600 rats trapped in various districts of Honolulu. Assuming that 1 infected guinea pig represented at least 1 infected rat 73 (12.1 per cent) of the rats harbored typhus virus in the brain. Of the rats trapped in seven districts of Honolulu the highest incidence of typhus infection was in rats from Kaimuki down town and Kalihi districts. The same districts also showed the highest incidence of human infection. 202 cases in five years. The surroundings of 43 of 50 of the patients were infested with rats. Typhus virus was found in the brain of 8 rats trapped in seventeen residences in which human typhus had occurred recently. As a result of guinea pig inoculation no typhus virus was found in the brain and fleas of 6 cats and the fleas of 1 dog from four residences with cases of human typhus. Similarly there was no virus in the brain of 109 cats and 26 dogs obtained at random from various parts of Honolulu.

MENDOZA (Lazaro) Tifus exantemático en el Salvador [Typhus in Salvador]—*Mem d V Congr Méd Centroamericana San Salva-*
dor 5-12 Nov 1938 pp 749-760

Nine sporadic cases of a typhus like fever were observed in the neighbourhood of San Salvador since 1937. The fever lasted 15 to 18 days the onset was sudden with severe pains in the limbs suffusion of the face and injection of the conjunctivae. The fever was continued but with morning remissions. It ended by rapid lysis. There was a generalized macular rash which had a distinct tendency to be petechial. There was no stupor and all the patients recovered. Louse infestation was said to have been excluded and there was no history of tick bite. Some of the houses in which the patients lived were rat infested.

In one case the Weil Felix reaction to *Proteus OX19* was positive 1-80 in another 1-500. In two others there were fleeting doubtfully positive reactions 1-200.

Suspensions of head lice collected from one patient towards the end of the attack were injected intraperitoneally into a guinea pig whose blood was later injected into three rats all of which died. One of them had a pronounced scrotal reaction. Smears from the lice contained Rickettsia like bodies. The disease was regarded as a flea borne fever of the typhus group [See this *Bulletin* 1943 Vol 40 p 136].

EDUARDO VÁSQUEZ (Luis) Mi contribucion a la busqueda del tifus exantemático en el Salvador [Enquiry into Typhus Exanthematicus in Salvador]—*Mem d V Congr Méd Centroamericano San Sal-*
ador 5-12 Nov 1938 pp 763-785 [22 refs]

A clinical description is given of 13 cases of a fever resembling those described in the preceding abstract. These also occurred in the vicinity

of San Salvador. One group of three patients had lived in the same house the onset of the fever was on the 23rd July 13th August and 22nd August in these cases all the others were entirely disconnected in their occurrence.

The Weil Felix reaction was positive in titres of 1-60 and 1-320 respectively in two of the 10 cases in which it was carried out. Among the eight patients with negative reactions were the three who lived in the same house.

The author is strongly inclined to the view that the fever belongs to the typhus group and that it is of the murine type. He appears to regard murine typhus and Brill's disease as being different names of the same fever. He considers however that the disease will have to be investigated by laboratory method before a final conclusion is reached with regard to its nature and he states that there are plenty of fleas ticks and rodents in the affected localities.

He also believes that the fever has appeared recently in Salvador because before the year 1935 when the first case was seen no fever resembling typhus had been observed by himself or other physicians of that country.

John H. D. McGraw

FLOCH (H). Fièvre typho-exanthématique à Cayenne [Exanthematic Typhus Fever in Cayenne]—*Bull Soc Path Exot* 1940 Jan 14 & Feb 11 Vol 35 Nos 1-2 pp 18-20

A case of typhus like fever of uncertain vector is briefly described. The patient an Arab aged 41 years had fever lasting about 14 days. The onset was gradual. A discrete rash appeared all over the body except the face and hands about the sixth day. The special feature was the occurrence of orchitis and epididymitis during the fever and the subsidence of the condition with the fall in temperature.

The Weil Felix reaction to *Proteus OX19* was positive 1-400 and the blood of the patient inoculated intraperitoneally into a guinea pig caused a fleeting rise of temperature with slight oedema and redness of the scrotum.

The author suggests that the case was one of murine typhus or of tick typhus.

John H. D. McGraw

TRAYASSOS (J) & VALLEJO-FREIRE (A). Soro anti rickettsial na febre maculosa experimental [Anti rickettsial Serum in Experimental Spotted Fever (of the Tick borne São Paulo Type)]—*Mem Inst Butantan* 1940 Vol 16 pp 285-307 With 10 graphs [20 ref. En l'h. summary.

The experiments described in this paper were in continuation of the work of MONTEIRO who at the Butantan Institute in 1931 showed that the serum of sheep immunized by inoculation of Rickettsiae had a neutralizing action on the virus *in vitro*. TOPPING in 1940 obtained a hyperimmune serum in rabbit inoculated with suspensions of ticks infected by the Rickettsiae of Rocky Mountain spotted fever. This serum was found to have a pronounced curative effect.

In the present experiments rabbits were inoculated with the blood of guinea pigs infected with Rickettsiae of the São Paulo type. Infected *Anopheles casennensis* were allowed to feed on the rabbits and after a resting period of two months the animal were repeatedly inoculated with progressively increasing doses of suspensions of infected ticks and also were subjected to the bites of infected ticks. Blood samples

were taken by cardiac puncture and the serum was concentrated by Felton's method. Full details of the technique and the results of the experiments are given.

Controlled experiments on guinea-pigs showed that the serum (1) neutralized the virus both *in vitro* and *in vivo* (2) conferred passive immunity for about one week (3) prevented infection when injected during the incubation period and (4) had a curative action during the first days of the fever.

The curative action is shown by the fact that of 16 treated animals 12 survived a heavy inoculation with *Rickettsiae* whereas of 16 controls only one survived. Preliminary experiments show that a protective serum can be prepared by hyperimmunizing horses and a report on this work is promised.

John H. D. Megaw

PARKER (R. R.) & STEINHILS (Edward A.) American and Australian Q Fevers. Persistence of the Infectious Agents in Guinea Pig Tissues after Defervescence—*Public Health Rep* 1943 Mar 26 Vol 58 No 13 pp 523-527

Rickettsiae of American Q fever were recovered from the kidneys of infected guinea-pigs up to 54 days after inoculation from the spleen up to 32 days from the lungs and brain up to 26 days.

Rickettsiae of Australian Q fever were recovered from the spleen and kidneys of infected guinea-pigs up to 120 days from the urine up to 110 days from the testes and seminal vesicles up to 100 days from the liver up to 60 days from the lungs up to 30 days and from the brain up to 15 days after inoculation.

In both sets of experiments the *Rickettsiae* were repeatedly and consistently recovered from the kidneys up to the end of the periods covered by the investigations 54 and 120 days respectively so that the end-points were not reached and the kidneys probably would have been found to harbour the infection for longer periods. In the case of the other organs and of the urine the findings were less consistent.

Australian Q *Rickettsiae* were injected *via* the urethra and vagina into several guinea-pigs all of which became infected. This finding and the persistence of *Rickettsiae* in the seminal vesicles suggested the possibility of transmission of infection during copulation but in tests on 19 female guinea-pigs only one became infected after copulation with an infected male and in this case there was no evidence that the act of copulation was responsible for the positive result.

Samples of urine from a patient suffering from American Q fever were tested on the third day after the onset of the fever and 19 15 and 22 days after defervescence. All the samples gave negative results.

John H. D. Megaw

BARTONELLOSIS

WEISS (P) Sobre inmunidad en la verruga peruana [Immunity in Verruga Peruana]—*Rev. Méd. Peruana* 1941 Apr Vol 13 No 148 pp 109-115

In Carrion's disease we have a condition which in most cases confers permanent immunity but in some goes on to a chronic process with

alternating improvement and deterioration which may continue for years. Animal reservoir hosts are immune and their immunity has been regarded as a form of premunition. The disease may be divided into two stages—the *haematic phase* of invasion before any anaemia is produced. This is a septicæmic stage and is followed by extension to the reticulo-endothelium and carriage to the tissues—the *histioid phase*. As a result the first red cells are destroyed (hence the secondary anaemia) and taken up by the reticulo-endothelial cells—the Kupffer cells and the lymphatic tissue in the spleen.

The author does not regard the erythrolysis as a toxic phenomenon but as defensive and the time of danger is when the *Bartonella* are disappearing from the blood corpuscles—that is at the beginning of the histioid phase. It is believed that the organism—the *Bartonella*—multiplies during the haematic phase in the red cells. The destruction of corpuscles and active regeneration are both caused by the presence of the organism in the blood.

H. Hald Scott

WEISS (P). Contribucion al estudio comparado de las Bartonellas [Contribution to the Study of Bartonellosis]—*Rev. Méd. Peruviana* 1941 Apr Vol 13 No 148 pp 116-120. With 3 figs & 3 charts. [34 ref.]

Human bartonellosis has comparatively restricted geographical limits. Peru, Ecuador and Colombia, or the Andes between 2°N and 13°S and only occurs in certain parts of this area whereas animal bartonellosis seems to be much more extensive perhaps having a worldwide distribution.

Severe forms of the disease in man are characterized by a regenerative macrocytic hypochromic anaemia identical with that resulting in animal (dog) splenectomized after infection. In man the reticulo-endothelial proliferation may result in verrucae such as not met with in animal infection. Of the forms of the organism coccoid bacillary and what the author calls hirsute the last like a violin bow with structure resembling an undulating membrane or beginning of growth of lateral branching. These seem to be peculiar to the organism in the dog. Another characteristic of *Bartonella bacilliformis* its resistance in infected blood and errucae nodules will contain virulent and culturable organisms after a long time at room temperature and even in the ice-box but the dog form is labile and under these conditions has disappeared from the blood in five days so that it is no longer virulent. Unlike animal bartonellas are susceptible to arsenical such as salvarsan or to Bayer SDT 856B an antimonial compound whereas *B. bacilliformis* is not nor is it affected by any drug at present known.

H. Hald Scott

DELGADO BEDOYA (G). Endo Flebitis errucosa. Phlebitis in Verrucae Peruviana.—*Rev. Méd. Peruviana* 1941 Apr Vol 13 No 148 pp 126-128.

Dr DAMASO ANTUNEZ in 1940 wrote that between the severe forms of Oroya fever and the ordinary verrucae with fever there is another characterized by fever and severe pain without much anaemia followed by phlebitis of the leg and thigh. The author divides phlebitis into surgical, obstetrical and medical categories and describes

its pathology [as given in text books] and then relates a case which was for a time puzzling. The patient was a man of 36 years complaining of severe lumbar pain worse at night on movement of the spine and on coughing. He had a bad history syphilis in the past was a heavy indulger in alcohol tobacco and coca and his mother had died of alcoholism. Wassermann reaction was negative but Kahn was +++ Later his left leg swelled and the calf became painful. Diagnosis was long in doubt and treatment varied but unavailing until the former was solved by the appearance of a verruga eruption on the face and arms. At the same time the pain and swelling began to subside. The verruga ran its course in 24 days and the patient left hospital. The author suggests the pathogeny to be that the verruga organism settles in the reticulo-endothelium and sets up degenerative and exudative processes succeeded by proliferation of the intima and venous obstruction. [As usual in Spanish papers the discussion on the diagnosis of a swollen limb includes phlegmasia alba dolens regardless of the sex of the patient.]

H Harold Scott

YELLOW FEVER

HUGHES (T P) The Reaction of the African Grivet Monkey (*Cercopithecus aethiops centralis*) to Yellow Fever Virus—*Trans Roy Soc Trop Med & Hyg* 1943 May Vol 36 No 6 pp 339-346

The grivet monkey *Cercopithecus aethiops centralis* Neuman is one of the most ubiquitous mammals in the East African zone of yellow fever endemicity and occurs commonly in Uganda the Belgian Congo Anglo Egyptian Sudan and other parts of the Ethiopian region. These monkeys are migratory and travel in small troops and if capable of circulating yellow fever virus in a concentration sufficient to infect mosquitoes might distribute infection throughout the range of migration.

It has already been found by FINDLAY, KIRK and MACCALLUM (see this *Bulletin* 1942 Vol 39 p 455) that about 20 per cent of these animals caught in two areas of yellow fever endemicity contain yellow fever antibodies. The present article deals with the reactions following the injection of pantropic virus the bites of infected mosquitoes and the injection of neurotropic virus.

Ten monkeys were inoculated intraperitoneally each with 1 cc of Asiatic serum virus in varying dilutions and their sera was tested for virus by intracerebral injection of mice. Eight showed circulating virus in the serum and five died. Two showed no signs of infection nor did a third inoculated with rehydrated virus. In addition seven monkeys were exposed to the bites of infected *Aedes* one to *Aed metallicus* and six to *Aed aegypti* and all showed circulating yellow fever virus. The titre of circulating virus varied from 3 300 000 to 10 428 000 mld per cc in the monkeys injected with virus and from 1 666 up to 330 000 000 mld per cc in those bitten by infected mosquitoes. Four monkeys inoculated with neurotropic virus in its 619th serial mouse passage gave completely negative results. The results show that certain individuals of this species of monkey are capable of circulating yellow fever virus in high concentration but there is a marked variation in susceptibility and in the titre of

virus It seems probable that this primate may serve as another link in the chain of circumstances resulting in the spread of yellow fever to man
E Hindle

Fox (J P) Immunity to Yellow Fever Encephalitis of Monkeys and Mice Immunized by Neural and Extraneural Routes — *Jl Exper Med* 1943 June 1 Vol 77 No 6 pp 487-506 [46 ref]

The author discusses the problem of producing an effective active immunity to viruses which attack the central nervous system and gives details of experiments supporting the view that the problem of immunizing the nervous system against a neurotropic strain of yellow fever virus is not dissimilar from that concerning primarily neurotropic viruses

Monkeys and mice surviving cerebral infection with yellow fever virus were found to resist large doses of highly neurotropic strains of yellow fever virus These animals however did not resist more than very small doses (approx 10 m l d) of Eastern equine encephalomyelitis inoculated intracerebrally

Animals immunized as the result of an ordinary systematic infection or by other extra neural routes were not uniformly resistant to neural infection with neurotropic virus Monkeys which had undergone systematic infection with virus of the avirulent 17D strain or of various jungle strains resisted only small intracerebral doses of neurotropic virus while mice even when hyperimmunized showed only irregular resistance to similar intracerebral inoculation

This difference in the immunity of animals as the result of either neural or extra neural methods is not related to similar differences in the levels of protective antibodies in the sera Actually the average titre of the hyperimmune mice was several times that of animals immunized as the result of an intracerebral infection

A possibly significant relation was found to exist between the resistance of mice to neural infection and the content of protective antibody in the brain The protective activity of brain suspensions from mice surviving cerebral infection was found to be several times that of brain suspensions from hyperimmunized animals

The author is of the opinion that the superior resistance to neural infection of animals whose immunity results from a previous non fatal infection of the nervous system is effected by a specific local mechanism which is based at least in part upon an increased concentration of antibody in the cerebral tissue
E Hindle

Fox (J P) Non Fatal Infection of Mice following Intracerebral Inoculation of Yellow Fever Virus — *Jl Exper Med* 1943 June 1 Vol 77 No 6 pp 507-520 [17 refs]

An account of experiments with various strains of yellow fever virus showing that specific but non fatal infections may occur among mice inoculated intracerebrally with the virus

Material for the initial study of non fatal infections with virus 17D was obtained by collecting all mice used in routine vaccine titrations which had shown any sign of illness and which were still alive on the 2nd day after inoculation In all 543 mice were collected 240 of these were tested for resistance to reinfection by intracerebral inoculations of virulent virus and only 2 failed to survive The occurrence

of completely inapparent infections with virus 17 D was also shown to occur. The proportion of non fatal infections was found to be related to the virus dose and to the substrain of 17 D used. Small doses produced a significantly higher proportion of non fatal infections than larger doses and different sub strains of virus 17 D varied greatly in the proportion of infections not ending in death.

Observations with other strains of yellow fever virus show that in the case of the French neurotropic strain and the pantropic Asibi strain inapparent infections though occurring occasionally are too infrequent to be of quantitative importance. On the other hand freshly isolated strains from Brazilian cases of jungle yellow fever present quite a different picture and the author gives the results of the inoculation into mice of seven strains isolated from patients in 1940 during an outbreak in Espírito Santo. Out of 100 mice inoculated only 62 developed fatal infections and of 20 survivors reinoculated intracerebrally with French neurotropic virus 17 resisted infection. Out of seven serum pools each from 1 to 4 mice four showed protective powers one was weakly positive and two negative.

It is evident that with these jungle strains the demonstration of non fatal infections is essential in any measure of the level of infectivity of virus preparations.

E Hindle

PLAGUE

Cossio (Pedro) Peste [Plague (in Argentina)]—*Bol Sanitario*
Buenos Aires 1942 Apr-June Vol 6 Nos 4-6 pp 167-168

The number of cases of plague in 1941 52 in all is four times less than in the previous year a result which must be attributed primarily to the antiplague measures adopted especially in the province of Córdoba (Argentina). Another remarkable fact is the very low mortality (60 per cent as against 90 per cent) in this year which seems to have been due solely to the use for the first time of sulphonamides in treatment.

W F Harley

ALBERTO ALVARADO (Carlos) Peste Zona Norte [Plague North
Zone (Argentina)]—*Bol Sanitario* Buenos Aires 1942
Apr-June Vol 6 No 4-6 pp 169-171

The intense endemic infection with plague of sylvatic rodents in the whole Northern Zone (Argentina) had its sequel in the occurrence in 1940 of human plague (138 positive cases and 37 suspected as well as unrecognized cases) which was followed by an extraordinary decline in 1941. In the course of the campaign of control 1 230 houses were visited 2 751 rodents captured and 24 found dead 28 719 arsenical baits were distributed etc.

W F Harley

SAVINO (Enrique) & RIESEL (Marcos A.) Casos de peste en la provincia de Jujuy (Relato de una misión sanitaria) [Cases of Plague in Jujuy Report of a Sanitary Mission]—*Bol. Sanitario* Buenos Aires 1942 July-Sept Vol 6 Nos 7-9 pp 375-389 With 14 figs & 2 maps

The cases of plague referred to arose in La Esperanza and Aguas Salada of the province of Jujuy (Argentina). Investigations were taken up rather late after the patients had died. Domestic rats found were mostly *Rattus alexandrinus* while the sylvatic rodents besides the cuis (*Galea musteloides*) were chiefly *Holochilus balnearum*. On the rats the fleas found were *X. cheopis* and on *Holochilus* the flea *Rhopalosyllus* *hyalinus*. The epidemiology of the outbreak is not at all clear. The disease was proven plague in the human beings, dead rats and the sylvatic rodents were examined but in no case was plague infection demonstrated. W. F. HARRIS

BOLETIN SANITARIO Buenos Aires 1942 July-Sept Vol 6 No 7-9 pp 459-465 With 8 figs—Inspección sanitaria realizada en el Puerto de Quequen y zonas adyacentes [Sanitary Plague Inspection of the Port of Quequen and Neighbourhood]

Investigation was made into the occurrence of plague in Quequen (Argentina). It was found that between November 1941 and April 1942 the number of plague rats had steadily declined from 16.4 per cent to 2.2 per cent of those examined. The conclusions arrived at are in the main that the introduction of plague coincided with the height of the epizootic in rats that it could be traced to the grain traffic by rail into the port and that there were many clues to show how intimate was the contact of the grey rat with the sylvatic rodents—the cuis. Thus besides direct observation of this association a flea of the grey rat (*Nosopsyllus fasciatus*) as found on the cuis *Galea leucoblephara* and cuis were found among the grain stores in the port itself. It is also quite possible that a rat epizootic had existed in the railway stations distant from the outbreak as evidence of dead rat remains was forthcoming. W. F. HARRIS

ALONSO MUJICA (Juan Carlos) La peste y su profilaxis en la República del Perú [Plague and its Prophylaxis in Peru]—*Bol. Sanitario* Buenos Aires 1942 July-Sept Vol 6 Nos 7-9 pp 475-485

Observations which are here recorded refer to plague in both Peru and Ecuador. The difficulties of anti-plague measures are much the same in both countries—these refer to the modes of life, custom and mentality of the people who are obstructive to all measures of hygiene, indulge in elaborate funeral ceremonies and are wont to resort to quacks and diviners. An outstanding character of the people is their close contact with and constant traffic in cuis (*Capra aegagris*) animals highly susceptible to plague and sometimes even the cause of an initial epizootic in distant places to which they have been consigned. Peru has regional laboratories in charge of a practical observer who is concerned with the classification of rats, their autopsy and the removal of a portion of spleen to be sent to the bacteriological laboratory in Lima. Rats are classified into the groups (a) fresh and apparently healthy, (b) those with suspicious lesions and (c) rats in a state of putrefaction. As bait for trapping 15 per cent white arsenic is used.

barium sulphate having been abandoned as being much less practical than arsenic. The cereal vehicle of the bait is varied according to circumstances. In Ecuador the Institute at Guayaquil has carried out autopsies on captured rats and classified them according to sex and species. Some of the results of prolonged observations are worthy of note. (1) The Norwegian rat predominates to the extent of 75 per cent and when this proportion of *Rattus norvegicus* approaches equality with other species it can be affirmed that the total rat population of the place has definitely decreased, an indication of unusual rat mortality. (2) The proportion of female rats to male is usually as five to one and when this proportion of captured rats approaches equality it can be affirmed that the total rat population of the place has definitely decreased. (3) The good general health of the rats (freedom from parasites and other infectious processes) is the usual index of decrease of the rat population. (4) When the known trapping index value exceeds 8 per cent [that is presumably when plague is found in more than 5 per cent of trapped rats] there is reason for alarm and increase of effort. Observations such as these and those on the rat flea index have proved of great value in demonstrating the existence of rat plague and also in forecasting the possibility of the outbreak of plague.

II F Harvey

DOUDOROFF (M) Studies on the Nutrition and Metabolism of *Pasteurella pestis*—*Proc Soc Experim Biol & Med* 1943 May Vol 53 No 1 pp 73-75

Valuable data on nutrition and metabolism are being accumulated by using bacteria as the testing organism for basal food requirements and accessory growth factors. The plague bacillus has been studied by Rao [this *Bulletin* 1939 Vol 36 p 963 1940 Vol 37 p 826] Doudoroff has used the same organism and has formulated noteworthy conclusions. (1) Cystine could be replaced with thiosulfate sulfite thioglycollate or homocystine but not with methionine. (2) Phenylalanine normally supported maximum development at a concentration of 0.0002% but the bacteria could be weaned from this requirement to develop at almost their normal rate without it. (3) With cystine and phenylalanine added to the medium mannitol was found to be almost as good a carbon source as glucose. (4) Amino acids were in general no more satisfactory as nitrogen sources than were ammonium salts. (5) Certain amino acids were inhibitory to growth when added to simplified media. (6) Very heavy cultures could be obtained in synthetic media with glucose and small amounts of cystine and phenylalanine if adequate aeration was provided by constant agitation. (7) Strain 1122 was capable of development under completely anaerobic conditions in complex media containing glucose.

IV F Harvey

PRINCE (I M) Species of Fleas on Rats collected in States West of the 102D Meridian and their relation to the Dissemination of Plague—*Pub Health Rep Wash* 1943 Apr 30 Vol 58 No 18 pp 700-708

A total of 4 188 rats collected by trapping and shooting (1935-1941) and their fleas in 13 States provided the material for study. The rats examined were the three common species *R norvegicus* *R rattus* and

R. alexandrinus and altogether 21 species of flea are listed of which the most commonly found in coastal cities were *Xenopsylla cheopis*, *Nosopsyllus fasciatus* and *Leptopsylla segnis*. Most of the fleas not ordinarily regarded as truly rat fleas probably came from those field rodents which are to be found around human habitations in rural areas and around city garbage dumps or were acquired in field rodent burrows or occasionally used by rats. No plague was found among the rats collected in the surveys here considered but nine of the species of flea collected have been found capable of transmitting plague under experimental conditions by biting hosts on which they do not occur in nature. The common rat flea *Leptopsylla segnis* even when proved to be infected experimentally did not transmit the infection under the conditions of testing.

Plague infection has been demonstrated in wild rodents of 12 Western States. It has been shown that city rats will migrate as far as four miles and that contact between urban rats and sylvatic rodents is feasible. It seems possible that fleas of the sylvatic rodents are now finding their way to rats in or near centres of population of coastal towns. Isolated specimens of plague-infected *R. norvegicus* were discovered in 1941 in San Francisco for the first time since 1908 although thousands of rats had been examined in the interval every year. Should the infection spread from the wild rodents to the urban rats it is possible that serious outbreaks of human pneumonic plague might occur.

W. F. Harvey

POUS (R.) Rats porteurs sains de bacilles de Vibrial Malassez [Healthy Rats Carriers of the Vibrial Malassez Bacillus]—*Bull. Soc. P. H. Exot.* 1942 Jan 14 & Feb 11 Vol 35 Nos 1-2 pp 49-51

A coccobacillus non motile Gram negative and pathogenic for mice was isolated from one of five captured and apparently healthy rats. It was to begin with pathogenic by subcutaneous inoculation to the guinea pig but gradually lost its virulence and it was not at any time pathogenic for the rat. In cultural characters it resembled in some respects the bacillus of plague. It is identified as a species isolated by VIGNAL MALASSEZ in the pseudotuberculosis of rodents and may easily lead to error of diagnosis in rodent plague.

W. F. Harvey

POILITZER (R.) & LI (C. C.) Some Observations on the Decline of Pneumonic Plague Epidemics—*Jl. Infect. Dis.* 1943 Mar-Apr Vol 72 No 2 pp 160-16

A rather characteristic outbreak of primary pneumonic plague has been investigated by the authors from the point of view of natural decline. In this case a patient returned to his own home, developed high fever, cough and bloody sputum, had no bubo, gave rise to an infection which spread out not only to his immediate family and involved the other households in a small village but was carried by relatives to five other settlements. The point stressed is that with the carriage of plague to the other settlements its symptom altered somewhat and in particular bloody frothy sputum the usual vehicle of infection was absent. This feature is correlated from post mortem observations previously made with the presence of only slight and ill defined pneumonia foci in cases which were otherwise pneumonic plague. In the present instance infection never resulted from contact with

patients having neither bloody sputum nor cough and it is concluded that this may be an intrinsic factor in the decline of epidemic pneumonic plague B F Harte

GIRARD (G) & ROBIC (J) L'état actuel de la peste à Madagascar et la prophylaxie vaccinale par le virus vaccin F V [The Present State of Plague in Madagascar Prophylactic Use of the E V Vaccine]—*Bull Soc Path Exot* 1942 Jan 14 & Feb 11 Vol 35 Nos 1-2 pp 42-49 With 1 chart

The two authors have written many articles during the last 20 years on plague as it prevails in the high plateaux of Madagascar. In the present article the account of prophylactic treatment with the well known E V attenuated living vaccine and the reduction of plague incidence is brought up to 1941. A remarkable graph shows how this occurred with the reduction proceeding from 3 493 in 1933-34 to 450 in 1940-41. During this time no change has occurred in the flea fauna of the rats. In 1940 2 357 *Xenopsylla cheopis* were counted on 474 captured rats an index of five per rat. This is the flea species which predominates. Other species are *Ctenopsylla musculi* and *Synopsyllus fonquerni*. Rats too are sometimes literally covered with the chigger *Echidnophaga gallinacea* [the sticktight flea] Vaccination when it reached 90-95 per cent of the population prevented the development of epidemic plague but it has not yet caused the complete disappearance of plague from Madagascar B F Harte

FINSTEDT WILDER (C) Aus dem Postlaboratorium des Hygienischen Instituts Hamburg [The Plague Laboratory of the Hygiene Institute Hamburg]—*Arch f Hyg u Bakt* 1943 Vol 129 No 1/6 pp 61-65

BACILLARY DYSENTERY

BULMER (E) & PRIEST (W M) Bacillary Dysentery Chemotherapy in its Treatment an Experience of 492 Cases in the Middle East—*Lancet* 1943 July 17 pp 69-71

In a previous paper [this *Bulletin* 1943 Vol 40 p 395] the results of a nine months trial of sulphaguanidine treatment for bacillary dysentery were published. These have now been confirmed by a further and equal period during which experiments have also been carried out with sulphanilamide and sulphapyridine. A table summarizes the clinical material upon which these observations have been made—

Amoebic dysentery including hepatic amoebiasis Acute catarrhal enteritis Bacillary dysentery	Cases		Percentage
	36 2 313 1 829	Sonne 6 323 97 63	1 55 44
(Of Positive Isolations) Flakner 70 Shiga 19		Schmitz 5)	
Treated with Sulphaguanidine			
Treated with Sulphapyridine			
Treated with Sulphanilamide			

In the Middle East bacillary dysentery has not been of a severe type and most cases would have probably recovered on expectant treatment

The diarrhoeal cases (other than amoebic dysentery) reported are classified as follows according to severity —

	Case	Type	Pe rcentage
Acute catarrhal enteritis	2313	Mild	56
Bacillary dysentery	189	Mild	20
		Moderate	—
		Severe	—

In the middle of 1941 the classical purgative treatment was abandoned—as scientifically irrational—with resulting increased comfort to the patients. In nearly 500 patients some form of sulphonamide has been given and in only eight Shiga cases was serum administered since the results with sulphaguanidine usually rendered this unnecessary.

Sulphaguanidine became available in April 1941. A standard dosage was adopted irrespective of body weight. The maximum total dosage was 300 gm. the average 100 gm. but it is concluded that if cases can be treated in the earliest stages 30–40 gm. will suffice. The initial dose was 6 gm. followed by 3 gm. four hourly until the stool were three daily thereafter the drug was continued in the same daily dose for two or three days. It has repeatedly been demonstrated that relapse occur if the drug is stopped too soon.

The patients treated with sulphaguanidine are divided into two groups—selected and unselected. 232 cases were carefully selected for treatment with sulphaguanidine. The average duration of stay in hospital was 17 days for the 200 acute cases in this group—a figure which contrasts with the average of 20 days for a random sample of 600 cases mostly treated on other lines. There were two deaths giving a fatality rate of 0.1 per cent. In neither case could the fatal result be attributed to failure of sulphaguanidine. Only two of the patients were invalided home. About 90 per cent of the whole group recovered completely and their response to the drug was proof of its specific action. The average number of stool was at the beginning of treatment 16 but by the fifth day it had fallen to 2–3. More striking still was the improvement in the patients general condition. In 43 cases treatment was commenced within three days of onset. The average number of stools at the beginning was 20 and had fallen to 2 on the fifth day. The average total dose was 90 gm.

In less severe cases and in enteritis sulphaguanidine was equally effective and it reduced the stay in hospital to 6 days after a dosage of 26 gm. contrasted with a figure of 10 days in 600 control.

Two patients with non specific ulcerative colitis whose histories extended back prior to the war failed to show any improvement when sulphaguanidine was given by rectal instillation as well as orally.

Among the 323 cases treated with sulphaguanidine often in large doses (up to a total of 300 gm.) very few examples of toxicity have been found. The drug does not upset the patient more than does kaolin. In four patients there were rubelliform rashes about the 10th day. There was one sulphaguanidine kidney which cleared up after

2 pints of 4.28 per cent sodium sulphate had been given intravenously. A series of 97 cases was treated experimentally with sulphapyridine on similar indications. The conclusions reached were that it was almost as effective as sulphaguanidine but was less desirable on account of the nausea, vomiting and general malaise produced. The average total dosage was 20 gm. One patient developed a sulphapyridine kidney but recovered. With sulphanilamide (average dose 20 gm) which was tried in 63 patients at a time when supplies of sulphaguanidine were restricted the results were not good.

CLAY (A. C.) Chemotherapy of Intestinal Infections treated with Sulphonamide Compounds—*Brit Med J* 1943 July 10 pp 35-36 [16 refs]

During 1941 and the first half of 1942 273 cases of bacillary dysentery (all proved bacteriologically) were treated in the City Hospital, Aberdeen. Of these 140 cases were treated on general lines with salines, 83 with sulphaguanidine, 50 with sulphanilamide. Stools were examined bacteriologically twice weekly and the blood sedimentation rate estimated on admission and on the completion of the course. The infections were mostly Flexner and Sonne, on the whole of a mild character with seldom more than 5 or 6 stools a day, some of which contained blood and mucus. A low grade pyrexia and minor signs of dehydration with occasional vomiting were observed in the 140 patients who received no chemotherapy. Out of 24 who could be described as acutely ill six died (two deaths being attributable to intercurrent disease).

Whenever necessary fluid was given intravenously in the form of glucose saline but as far as possible patients were encouraged to take fluids by the mouth in quantities of 8-10 pints in 24 hours for adults proportionately less for children.

Those receiving sulphaguanidine were given a five day course the dosage being calculated for the body weight. The initial loading dose during the first 24 hours was 0.5 gm per kilo and this was followed by a maintenance dose of 0.1 gm per kilo for the next four days. Those receiving sulphanilamide were given a dosage amounting to half the quantity of sulphaguanidine. The tablets were powdered and administered in milk four hourly for the first 24 hours and three times daily for the next four days.

The stay in hospital and the number of days during which the stools remained positive were reduced by half in the sulphaguanidine treated cases as compared with those receiving no chemotherapy except in the case of Sonne convalescent carriers in which both the stay in hospital and the number of days they remained bacteriologically positive were slightly increased.

WEST (Robert F.) Bacillary Dysentery: some Results and Conclusions from a Series of Patients treated with Sulphaguanidine—*Med J Australia* 1943 Apr 17 30th Year Vol I No 16 pp 344-347

This paper which follows much the same lines as many others recently reviewed in this *Bulletin* is based on a survey of patients suffering from diarrhoea in hospital over a period of three months from March 1st to May 30th 1942. All those suffering from diarrhoea

Treatment consisted in routine administration of camphorated tincture of opium and bismuth subcarbonate and wherever indicated dehydration was controlled by parenteral fluids. One group of 12 patients was given sulphaguanidine another group of 24 was given succinylsulphathiazole. In most cases the drugs were started on the first or second day of the disease. The dose of sulphaguanidine was 0.1 gm per kilo initially and later 0.3 gm per kilo daily divided into six equal parts. The dosage of succinyl sulphathiazole was 0.25 gm per kilo initially and 0.25 gm per kilo divided into six equal parts and given every four hours. The duration of the sulphonamide therapy varied from 2 to 14 days in most it was six days.

On alternate days during treatment complete urine analyses determinations of haemoglobin white blood cell counts and sulphonamide blood concentrations were obtained. Although in the majority the level of blood concentration varied from 1 to 5 mgm per 100 cc yet in one a figure of 10 mgm per 100 cc followed the administration of 81 gm sulphaguanidine in eight days in another 16.6 mgm followed the administration of 27.5 gm in three days.

Slight vomiting occurred in one case with each drug. No nauca or haematuria was observed though crystals were found in the urine in 6 out of 10 patients who received sulphaguanidine and in 10 out of 14 who received succinylsulphathiazole. One patient on sulphaguanidine developed drug fever the subsequent administration of a test dose of 4 gm of sulphaguanidine revealed the existence of sensitivity to this drug.

It is evident that both sulphaguanidine and succinylsulphathiazole are of distinct value but because the latter is equally effective and without the potential toxic effects of the former it is believed to be the drug of choice in the treatment of Flexner dysentery.

P. Manson Bahr

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

Ort (Alois) Ueber das Vorkommen von *Entamoeba histolytica* im Duodenum beim Menschen [*E. histolytica* in the Human Duodenum]—*Dent. Trop. Ztschr.* 1942 Dec 15 Vol 46 No 24 pp 603-605

In 13 cases of demonstrated amoebic infection of the large intestine the author has examined the duodenal contents removed by duodenal sound. In six of the cases free *Entamoeba histolytica* or cysts were encountered—usually only isolated examples of the parasite were seen but in one case there was a heavy infection five to ten amoebae being seen in a single field of the microscope. In one case cysts alone were found. The author discusses the origin of these amoebae and comes to the conclusion that it is not possible to state whether they had ascended from the large intestine or come from the liver. In only one of the six positive cases was there evidence of hepatitis. [See also WESELMANN this *Bulletin* 1943 Vol 40 p 606]

C. M. Henry

BRADY (F J) JONES (Myrna F) & NEWTON (W L) Effect of Chlorination of Water on Viability of Cysts of *Entamoeba histolytica* — *War Medicine* Chicago 1943 Apr Vol 7 No 4 pp 409-419 [Refs in footnotes]

Experiments were carried out to test the action of chlorine on cysts of *Entamoeba histolytica* suspended in natural surface water. The water was contained in army Lyster bag each of which holds 30 gallons. To chlorinate this quantity of water 500 mgm ampoules of calcium hypochlorite are supplied. The ampoule contains 10 per cent available chlorine. To carry out the tests measured quantities of cysts were added to the water after the contents of one to fifteen ampoules had been mixed with it. The quantities of cysts gave a concentration of 20 cysts per cc of chlorinated water. At varying interval measured amounts of water were withdrawn and the chlorine neutralized with sodium thiosulphate. The cysts were allowed to sediment and the cyst containing deposit was inoculated into ten tubes of culture medium each tube receiving approximately 2 000 cysts. It had already been shown that a minimum of 20 viable cysts was required to give a culture consistently. With water to which had been added the contents of one ampoule the cysts withdrawn at intervals up to 150 minutes gave cultures of amoebae in nearly half the tubes inoculated. With water to which 15 ampoules had been added nearly all the tubes gave cultures with cysts exposed for 15 minute or less. Of 150 cultures made after 15 minutes exposure none were positive. It would appear that cysts cannot be killed by chlorine in any practicable concentration unless exposure is for 90 minute or longer.

C M Herriot

The author has had a first hand knowledge of American ticks for many years. He presents a valuable account of the characters to which attention should be paid in identifying Ornithodoros and an annotated list of the species of the world. The paper is a very valuable summary of the subject [though we believe that *Ornithodoros coniceps* has been omitted in error].
 It seems that the species feeding on bats are generally confined to that group of hosts. Other Ornithodoros feed on several hosts and *O. turicata* has been recorded from a number of mammals (man, rodents and ungulates), one bird and several reptiles. Nineteen of the known 40 species are known to bite man. In the Americas five (*talaje rudis hermsi turicata* and *parkeri*) all transmit spirochaetes of human relapsing fever.
 P + Burton

DAVIS (G E) Relapsing Fever the Tick *Ornithodoros turicata* as a Spirochetal Reservoir — Pub Health Rep Wash 1943 May 28
 Vol 58 No 22 pp 839-842

The author has tested the infectivity of *Ornithodoros turicata* through five generations and shows that this tick may be a more efficient spirochaetal reservoir than the rodent host.
 The original stock comprised 86 ticks collected from the sand and from a cottontail rabbit in the burrow of a prairie dog (*Cynomys* sp.) in Clark County, Kansas. A strain of spirochaetes was recovered by feeding the ticks on a white rat. One of the infected nymphs reared to a female served as the origin of the ticks used in this experiment which extended over six years.
 The progeny found to be infective in each of the five generations amounted to 6 ticks (30 per cent), 55 ticks (96 per cent), 66 ticks (100 per cent), 107 ticks (47 per cent) and 136 ticks (100 per cent) respectively.
 E Hindle

VAHIL (R J) Reporting a New Form of Rat Bite Fever or Sodoku in Bombay (the Gummatoid Form) — Indian Med Ga 1943 Feb
 Vol 78 No 2 pp 68-69

A description of two new cases of rat bite fever occurring in Bombay and a short summary of two previously reported cases all showing the rare clinical condition of multiple gummatoid lesions (within muscle and periosteum) associated with the usual manifestations of this disease.
 Unfortunately the causal organism was not isolated from any of these patients the diagnosis being made entirely on the clinical records of the cases.
 E Hindle

LAHIRI (M N) A Study on Leptospirosis in Bombay City — Indian Med Ga 1943 Feb Vol 78 No 2 pp 65-67 [10 refs]

A record of six cases of leptospirosis recognized in Bombay City during the six months following the author's discovery of the first

proved case of the disease in 1941 [see this Bulletin 1942 Vol 39 p 346]. The diagnosis in each case was confirmed bacteriologically and all belonged to the typical *L. icterohaemorrhagiae* group.

The cases occurred in different localities and all were in adult males between 20 and 40 years of age. No occupational incidence was noted but the premises in which they occurred were all heavily infested with rats which could seem to be the probable source of the infection. It appears likely that the disease is more common in the city than was previously supposed.

E Hindle

LEPROSY

INDIA GOVT OF CENTRAL ADVISORY BOARD OF HEALTH Report on Leprosy and its Control in India. By the Committee appointed by the Central Advisory Board of Health (1941)—1 + 70. With 2 maps. 1942. New Delhi: Govt of India Press.

This is a comprehensive report of the progress of leprosy work with recommendations for the future by a committee including such experts as Drs COCHRANE, LOWE and DHARWENDRA. A brief historical introduction is followed by the main findings of various previous inquiries and international and other conferences. The main factors influencing the problem in India are considered and the agencies at work there are described together with the present position of anti-leprosy work with chapters on leprosy, out-patient clinics and in-patient institutions. Previous leprosy legislation in India is described most of which is either inefficient or not enforced even in the cities which are alone influenced by it and the requirements for future anti-leprosy work are pointed out. The following are the most important conclusions and recommendations.

It is recognized that the great advances of the last two decades resulted from the improved treatment worked out in Calcutta but the hopes held out by some that large-scale out-patient treatment at numerous clinics might solve the leprosy problem in India have not been fulfilled although they have greatly benefited the community. Valuable surveys and epidemiological inquiries have been made but they do not remove the necessity of providing in-patient leprosy colonies under rural conditions for the isolation of the more infective cases. Only one province possesses such a model institution which is described but not named although the Lady Willingdon Leprosy Colony near Madras is clearly indicated. At least one should be provided in every province with a good staff to allow teaching and research into problems of epidemiology and treatment. [That is just what was advised by ROGERS at a small conference organized in Calcutta by the Mission to Lepers early in 1920 which is not mentioned in Chapter II on Leprosy Conferences.] Home isolation is also discussed but has not yet proved to be of much value. The now generally recognized necessity of protecting children from infection is also emphasized. It is stated that in 1925 the newly formed Indian Council of the British Empire Leprosy Relief Association started a research unit at the School of Tropical Medicine Calcutta. [It was in fact started late in 1920 under Dr E. Muir but after 1925 it was financed and extended by the new association.] It is suggested that a separate leprosy research unit should be founded near a large rural out-patient institution.

Calcutta leprosy research laboratory has no in patients for study. It is also suggested that a new Leprosy Act of a more comprehensive nature should be passed
L Rogers

COCHRANE (R G) *Leprosy in relation to Public Health* being a Course of Lectures delivered at the Course of Training for Health Officers held at the Lady Willington Leprosy Sanatorium Chingleput 49 pp 1941 Madras Govt Press [For official use only]

The introduction states that the object of this course of lectures is to arouse such interest sympathy and enthusiasm that you will join that band of workers determined to contribute their utmost to the elimination of a disease which has baffled man for countless generations. After a short history of the spread of leprosy its epidemiology and aetiology are briefly discussed. Stress is laid on the frequency of infections during childhood and it is pointed out that although in the Madras experience of the lecturer benign lesions of a stationary or improving condition form about half their infections he is in agreement with the early contention of ROGERS and MUIR that close and prolonged contact with leprosy during childhood is a very important cause of infections. Sex and race incidence and the influence of climate and other factors are discussed on the usual lines. A section on pathology follows expressed in as simple language as possible. The clinical signs are more fully described and are based on the classification of the Cairo Conference of 1938. Treatment and prognosis are more briefly dealt with as not coming within the scope of Public Health Officers but a timely warning is given not to depart from the well tried and accepted derivatives of hydnocarpus oil or to be misled by the extravagant claims of firms interested in special drugs of their own. In the treatment of acute lepra reactions the lecturer advocates intramuscular injection of foudadin. Prognosis is illustrated by a useful table and the seriousness of lepromatous cases in childhood is pointed out.

Rightly the longest section of this booklet namely nearly one third is devoted to prevention. The necessity for isolation of the most infective cases is insisted on and emphasis is laid on selective segregation of infective cases from contact with healthy members of the community either by compulsory or voluntary measures. The latter are considered to be preferable and alone practicable in such a widely infected and so poor a country as India with probably 300 000 cases in the Madras Province alone. With this end in view an attempt is being made in Madras to organize village isolation limited to areas in which surveys show the problem to be serious and the problem of infected children is being especially studied. The importance of propaganda and training of the medical profession is regarded as essential to success. Enough has been said to bring out the value of this publication to public health officers and it bears the stamp of a keen and experienced worker which will ensure its use far beyond India.
L Rogers

PARDO CASTELLO (V) & TIAN (Francisco R) *Leprosy The Correlation of its Clinical Pathologic Immunologic and Bacteriologic Aspects*—*Jl Amer Med Assoc* 1943 Apr 17 Vol 121 No 16 pp 1264-1268 With 1 fig [15 refs]

This paper describes the types included in a comprehensive classification of leprosy cases based on pathology bacteriology and immunology

[October 1943]

left off after the first five to seven months. In animals treated only during the last seven months of the experimental period when the infection had already obtained a good hold the lesions were greater than in those treated only during the first five months but less than in untreated animals.

Tests of the viability of the lepra bacilli after the full development of the lesions had been inhibited by a year's treatment showed that they had retained their virulence unimpaired and the bacilli had not been rendered sulphanilamide fast. Histologically the lesions in the treated animals showed no important differences except that there were fewer bacilli and giant cells and no fibrous encapsulation. These lesions therefore resembled those caused by heat-killed bacilli. Experiments with albino mice showed very similar results. The single trial of sulphonaphthazole produced effects similar to those of the other drugs. With neither was there any evidence of the lepra bacilli being killed but only retardation of their effect during the continuance of the drug.

L. Rogers

times in the intestine. Worms were also studied in intestinal contents with and without anthelmintics because the intestinal contents affect anthelmintics chemically and physically. The doses are those used in 100 cc of water.

Early experiments showed that known anthelmintics were active on the worms but only so in water. In intestinal contents they were either not active or were so only after a long time. The anthelmintics tried were santonin, oil of chenopodium, ascaridol, hexylresorcinol and caprokol. The two latter were hardly obtainable and in 0.03 gm santonin movement ceased in a few minutes but returned without washing the worms after 15-20 minutes so that its action was only transitory. Most of the experiments therefore were done with oil of chenopodium. Strychnine and picrotoxin increased the activity for an hour. Sodium phenyl ethyl barbiturate (0.3 gm) was quite inactive with 0.01 gm (1 gm) increased the activity especially when given within 1½ hours. Urethane (1-3.3 gm) acted only after ¾ to 1 hour with 0.01 gm strychnine causing complete loss of movement (1-1.5 gm) acted in 10-13 minutes but movements returned after 20 minutes. Paraldehyde (1-1.5 gm) acted in 10-13 minutes but movements returned after 20 minutes. Chloroform used as Aqua chloroformi was active in water 15 gm being always so 7.5 gm not always so but were motionless again. Chloroform used as Aqua chloroformi was in intestinal contents both these doses were inactive or active only after a long time. Only doses of 30 gm act quickly and with certainty. Ten cc of alcohol acted quickly and with certainty 5 cc more slowly but both these doses acted within the same time in both water and intestinal contents. The addition of 15 gm of aqua chloroformi to 5 cc of alcohol markedly quickened its action. The simultaneous administration of 0.5 gm paraldehyde 15 gm aqua chloroformi and 5 cc alcohol quickened the individual action of these substances both in water and in intestinal contents. Possibly the action is quicker because the alcohol brings the paraldehyde into solution. The action of oil of chenopodium is delayed in intestinal contents but the addition to it of alcohol and chloroform or paraldehyde increases its activity both in water and in intestinal contents. These four substances together give the best results.

The inactivity of anthelmintics may be due to the inactivation of the anthelmintic by the intestinal contents to the protection afforded by the mucus which surrounds worms taken fresh from the intestine and to the fact that capsules in which anthelmintics are often given do not open until they have passed below the region inhabited by the worms. The author found that enteric or alkali solvent capsules remained undissolved for an hour at body temperature in a solution of 0.5 per cent trypsin made alkaline with 0.2 per cent sodium carbonate. He suggests the following procedure to overcome these difficulties. A duodenal sound is passed under Roentgen ray control the intestine is emptied and the mucus in it dissolved by washing out with sodium bicarbonate solution after a quarter of an hour 100 cc of water containing 0.06 gm oil of chenopodium 0.5 gm paraldehyde 15 gm aqua chloroformi and 5 cc absolute alcohol are passed through (0.03 gm santonin can also be added). This is repeated after half an hour to attack resistant worms and worms unaffected because their mouths were applied to the mucosa while the first dose was being given. After another quarter of an hour a saline purge is administered.

PAČIĆ (J. A.) Massenhafter Spulwurmbefall im Röntgenbild nach
gewiesen [Massive Infestation with *Ascaris* demonstrated by
Röntgen Ray Photograph]—*Der Chirurg* 1943 Feb 1 Vol 15
No 3 pp 77-79 With 1 fig

The patient was a girl aged 5 years. For 3 days she had had intermittent abdominal pain, vomiting, obstinate constipation and flatulence. During these attacks a knotlike swelling could be made out which tended to disappear with audible splashings as the pain diminished only to reappear again with repetitions of the attacks. Beneath the navel elongate resistant tructures were palpable which moved under light massage and kneading often with the production of spasm of the intestine and pain. This spasm disappeared with cooing and splashings.

Ascaris is very common in Dalmatia and Pačić's wide experience of it suggested that the case was not urgent. It was treated with the usual doses of castor oil and calomel. These drugs were sometimes vomited and sometime retained. The patient's condition improved with the passage of much hard and large stools in which numerous *Ascaris* were found. The radiogram figured was taken 18 hours after barium meal. It clearly showed the worms arranged parallel to one another in bundle. This condition is not so dangerous as when they are tangled into a ball which may cause intestinal obstruction. Other cases illustrating this latter condition are briefly described. The arrangement of the worms in parallel bundles in the case here described did not cause complete intestinal obstruction although extensive coils of the intestine were involved. Subsequent doses of castor oil removed 373 worms all of which were adults. It was remarkable that repeated examination of the stool failed to reveal any eggs of *Ascaris* but males were preponderant in the worms passed in the proportion of four males to one female. Further radiogram failed to show that any of the barium meal had been ingested by the *Ascaris*.

G. Lafae

WATT (John V.) Active Immunization of Rats against *Yppos-
tomonis*—*Proc Soc Exptl Biol & Med* 1943 Feb
Vol 40 No 2 pp 67-70 With 2 figs & 1 chart

The filtered aqueous extract of dried adult *Yppostomonis muris* and of larvae of the same species the author produced immunity against infestation with this species of nematode by subcutaneous injection of the filtrate. The strain of *Y. muris* used had been obtained in 1939 from a wild Norway rat. Infective larvae were washed repeatedly in tap water in a centrifuge and an estimated number of them were spread on the shaved abdomen of a rat lightly anaesthetized with ether and were left on this for 30 minutes. The infestation was produced as estimated by egg count of the faeces of the rats and by killing the rats and counting the worms in the small intestine and the larvae in the lungs. Antisera were made by repeatedly washing in distilled water adult worms or larvae taken from infested rats. These were then dried in a desiccator for three to four days the resulting mass was powdered and mixed with 0.85 per cent salt solution usually in the proportion of 1 in 50. In this suspension extraction proceeded for 24 hours at room temperature followed by five to six days in the refrigerator. The suspension was then shaken for one hour and put

through a Seitz filter the filtrate having a pH of 7.2 to 7.3. This stock antigen was kept in the refrigerator. To produce immunity 2 cc of the antigen per 100 gm rat weight were given subcutaneously in a dilution of 1 in 200 followed by 1200 larvae placed on the shaved abdominal skin. In the first experiment it was found that 12 days after infestation both the rats given the adult antigen and those given the larval antigen had considerably fewer adult worms especially those given the antigen 20 days before infestation than the control. In the second experiment the rats given the larval and adult antigens all produced fewer eggs especially between the 10th to the 13th days after infestation. On the 27th day after infestation when all the egg counts were low there were more larvae in the lungs of the immunized rats fewer females than males in the intestines of the immunized rats and also more immature males and females in some of them.

The author concludes that immunity can be produced to a marked degree by injection of antigens prepared by extraction of adult and larval *N. muris* that the immunity is effective against both the larvae in the lungs and against the intestinal phases of the worm and possibly also against its larvae in the skin. Immunization by antigens of the types used precludes any possibility of premunition.

G. Lapage

WATT (J. V. C.) GOLDEN (Walter R. C.) OLASON (Fridgair) & MLADINICH (George). The Relationship of Vitamin A to Resistance to *Nippostrongylus muris*—*Science* 1943 Apr 23 Vol 97 No 2521 pp 381-382

The above results indicate that the lack of vitamin A in the diet of the experimental animals lowers their resistance to primary infection as well as subsequent reinfection with *Nippostrongylus muris*. Furthermore plasma derived from animals with low vitamin A levels affords no protection against this parasite in the way of positive transfer of immunity. In contrast the rats fed on the same diet plus vitamin A supplement developed a marked resistance to infection with this nematode such as has been described by Schwartz *et al.* in addition to protection rendered normal rats by plasma from hyperimmunized rats as previously demonstrated by one of us.

RILEY (E. G.) The Effect of Various Stages of Vitamin A Deficiency in the White Rat on the Resistance to *Nippostrongylus muris*—*Jl Infect Dis* 1943 Mar-Apr Vol 72 No 2 pp 133-141 With 1 fig [22 refs]

A decrease in resistance to infection of A avitaminotic white rats with *Nippostrongylus muris* found by Spindler is confirmed.

The decrease in resistance does not become evident until the rats have been upon the deficient diet for 4 weeks. After 2 weeks of vitamin A depletion there is actually an increase in resistance to infection.

The changed resistance manifests itself by a more intense and prolonged infection.

Immune serum is relatively as effective in decreasing the peak of infection in both normal and deficient rats although in the latter many of the worms may merely be slowed in their migration through the body of the host.

LEVIN (M B) Infestation with *Strongyloides stercoralis* — *Jl Lab Med*
Chil Med 1943 Mar Vol 28 No 6 pp 680-682 With 4 fig

A case is reported in which (1) infestation of *Strongyloides stercoralis* parasites was contracted in a relatively northern region and (2) the rarely observed male larval and adult form of the *Strongyloides stercoralis* was found in the stool

CULBERTSON (James T) Natural Transmission of Immunity against *Trichinella spiralis* from Mother Rats to their Offspring — *Jl Parasitol* 1943 Apr Vol 29 No 2 pp 114-116 [10 ref]

The transmission of immunity against *Trichinella spiralis* from mother rats to their young takes place in the same manner as does that against trypanosomes—that is largely or entirely by the ingestion of the milk of the immune mother. Little or no transmission occurs while the young are in the rat uterus by way of the placenta. Although the conclusion is established from the data offered in the case of trichinosis it is however not necessarily true that the same route of transfer operates in the human infection with the same parasite. Most authorities feel indeed that in most human infection acquired immunity is transmitted from mother to young by way of the placenta and not through the milk.

The immunity acquired by rats after infection with *Trichinella spiralis* is transmitted to their young the transfer occurring largely if not entirely through the milk of the immune mother. The young born of normal mother rats promptly become immune if permitted to nurse an immune mother rat. Conversely the young of an immune mother are as susceptible as the young of a normal mother if they are transferred at birth to a normal mother.

FITCHER (Jacob H) Number of Larvae and Time required to produce Active Immunity in Rats against *Trichinella spiralis* — *Jl Parasitol* 1943 Apr Vol 29 No 2 pp 123-126 [14 ref]

It appears evident from the low numbers of adult *Trichinella spiralis* recovered from the intestines and the low numbers of larvae recovered from the muscles of rats that a single small dose of larvae capable of producing immunity and that a period of approximately 14 days is adequate to develop this immunity. The feeding of 80 larvae produces a fairly high degree of immunity in 14 days; the 160 dose produces in the same length of time a higher degree of immunity while both the 320 and 640 doses of larvae apparently produce complete immunity in a period of 14 days. The immunity produced is effective against the intestinal phase of the parasite. Little or no immunity is produced within seven days after feeding 80 to 640 larvae.

WILKINS (Robert S) Human Trichinosis following Ingestion of Bear Meat — *Jl Am Med* 1943 May 2 Vol 11 No 4 pp 777-778
 [See Bittner (H) *etc* 1931 Vol 6 p 61 193 Vol 7 p]

OFFICER BROWN (C J) Hydatid Disease of the Lung—*Rev Melbourne Hosp Clin Rep* 1942 Dec Vol 13 pp 66-71 With 12 figs (11 on 3 plates)

DEFICIENCY DISEASES

FOLLIS (Richard H) Jr MILLER (Mitchell H) WINTROBE (Maxwell V) & STEIN (Harold J) Development of Myocardial Necrosis and Absence of Nerve Degeneration in Thiamine Deficiency in Pigs—*Am J Path* 1943 Mar Vol 19 No 2 pp 341-357 With 2 text figs & 4 figs on 1 plate [23 refs]

It is always wise to be guarded in applying the results of animal experiments to seemingly analogous conditions in human subjects. The authors have carried out some very instructive experimental work on pigs and have with due caution drawn attention to its possible application to beriberi in man.

Thiamin has been found to alleviate cardiac embarrassment most dramatically in certain cases and the authors have aimed at determining what connexion might exist between the beriberi heart and thiamin deficiency. They used pigs as experimental animals. One group received (per kgm per day) 0.12 mgm riboflavin 1.2 mgm nicotinic acid 0.2 mgm pyridoxin hydrochloride 10.0 mgm cholin chloride and 0.5 mgm calcium pantothenate no thiamin. A second group received the same plus 10 μ gm thiamin hydrochloride i.e. a low thiamin group. A third group had desiccated whole liver containing about 40 μ gm thiamin or less but rich in the other components of the B group. On death of the animals whether natural or not complete autopsies were performed and particular attention was paid to heart lungs brachial sciatic and vagus nerves the motor and sensory nerve roots dorsal root ganglia and spinal cord. A cardiac lesion constantly found was dilatation the mode of death being that of heart failure with laboured breathing and cyanosis others died unexpectedly and unobserved at night. Focal and diffuse myocardial necrosis was found in those dying with thiamin deficiency. None of the controls receiving thiamin presented any myocardial changes.

In comparing these with what is known of beriberi in man the authors deplore that so few microscopical studies of the heart have been made. The changes mentioned under the terms Fiedler's myocarditis or isolated myocarditis of unknown aetiology closely simulated those found in the experimental pigs. The older ideas that beriberi heart was due to vagus degeneration or respiratory paralysis have been discarded and the water retention of WENCKEBACH or hydropic degeneration is not limited to beriberi hearts but is found in cardiac failure from various causes. An important fact is noted namely that a metabolic disorder of the myocardium may precede any anatomical changes and death may take place before the development of recognizable cardiac lesions.

H Harold Scott

the compounds would be ineffective if used orally or parenterally in treatment of blastomycosis. As a wet dressing or powder applied locally on cutaneous lesions sulphadiazine sulphamidate sulphapyridine and sodium ulphapyridine might be effective therapeutically as the local concentration would be considerably higher than that which can be maintained in the blood.

Sidney Thomson

BRIDGER (A. C.) DOUGLAS (G. R.) HERRELL (W. E.) & VAUGHAN (L. D.)
Histoplasmosis producing Venetian Endocarditis. Review of Literature with Report of a Case. *Jl Amer Med Assoc* 1943 June 19 Vol 122 No pp 489-492 With 4 figs. Ref in footnote.

The only morbid signs or symptoms in the case of histoplasmosis in an American male white aged 47 were irregular fever of four months duration and a soft systolic heart murmur suggestive of endocarditis. There was an earlier history of peritonillar abscess and an abdominal disturbance suspected to be cholecystitis. Exhaustive physical examination at the Mayo Clinic revealed nothing abnormal except the apparent endocarditis. A tentative diagnosis of subacute bacterial endocarditis was not confirmed by blood culture and in view of the history of earlier hepatic disturbance an exploratory laparotomy was done. Exploration of the liver for evidence of entamoebic abscess gave a negative result and before completing the operation a small piece of the liver was removed for microscopic examination. The liver section showed the characteristic picture of histoplasmosis and the parasite was identified *in situ*. Treatment with tartar emetic was without effect and the patient died 11 weeks after the operation.

At the autopsy the heart showed old-standing rheumatic endocarditis with superadded histoplasma infection affecting both mitral and aortic valves and *Histoplasma capsulatum* was identified *in situ*. A few yeasts of the parasite were found in the spleen but despite lesion suggestive of histoplasmosis and the ante-mortem findings in the liver section the parasite was not found in the liver kidney or any other organ.

Presumably the diagnosis of histoplasmosis was not confirmed by culture of the fungus.

The interesting features of this case are the paucity of signs or symptoms despite the extent of the infection pointing to histoplasmosis in any clinical form and the extraordinary way in which the diagnosis was made. Failure to find identifiable parasites *post mortem* where they had been numerous is certainly not an uncommon experience in histoplasmosis.

This report gains additional interest from the fact that to our knowledge no other case of histoplasmosis has not yet published have been identified in England.

J. T. Duncan

MISCELLANEOUS

THOMAS (R. H.) *Small Sanitary Structures the Need for Care in Design*—*Jl Roy San Inst* 1943 July Vol 63 No 3 pp 132-140 With 8 figs

The author of this article is an Inspector in the Department of Health Northern Rhodesia the Small Sanitary Structures dealt with are French drains soakaways grease trap and bucket and pit latrines

The populations concerned are those of four main towns on the Northern Rhodesia Railway strip the average white population being 1 000 with 6 000 Africans and a minority of Indians The country is only now beginning to emerge from its pioneer days The author outlines measures which he has adopted to overcome some of the problems met with and to break down the prejudices of the (indigenous) population

In general the method adopted for the disposal of waste water from households hotels and laundries is by soakaways (also referred to as septic tanks) fed by French drains and the construction of these is described With such a system the author experienced the inevitable trouble due to grease etc rendering the soakaways water tight and much of the article is devoted to the design and construction of grease traps intended to prevent this trouble The grease-traps described and illustrated consist of three chambers the centre chamber being only slightly larger than those at the ends The first or inlet chamber is hewn filled to water level with clinker the second and third chambers are baffled in varying ways A charge of lime—approximately two pounds per month—is placed in the centre chamber It is claimed that the effluent is clear and appears free from suspended matter or grease [However this may be these grease traps embody many undesirable features e.g. the clinker in the first chamber which would be cleaned out weekly can serve no useful purpose and it must greatly complicate the cleansing process the arrangement of the chambers and baffles could be both simplified and improved] Two traps (of 56 and 73 gallons capacity respectively) are shown each embodying similar principles though differing slightly in construction

The statement is made that The author's grease trap sizes agree very closely with those tabulated by Major Clay in Camp Sanitation though the design appears to be rather different from that which he has in mind Ref *Jl Roy San Inst* 1942 Vol 62 p 62 [In fact similarity is confined to the effective capacities—not the sizes—dealt with in other respects these grease traps are totally different from those described in the article to which the author refers]

The soakaways described and illustrated are honey comb brick lined at the sides the floors being covered with a deep layer of stone the purpose of which is to prevent soil erosion The brickwork is 18 inch solid work for the lowest six or seven courses reduced above to 14 and 9 inch work Concrete covers with access doors are provided The capacities are equal to approximately one and a quarter times one day's estimated flow of waste water which is in accordance with general practice

[It is difficult to see the advantage of this expensive form of construction for oakaway since in the event of their becoming water tight no amount of cleaning of the interior could greatly improve the absorptivity of the surrounding earth.]

Dealing with European and Native convenience the author describes and illustrates several forms of bucket latrines as he found them and gives details of design evolved and used to replace them.

Outside town areas pit latrines are commonly used. The pits are made 2 feet 6 inches in diameter and from 15 to 30 feet in depth. The method of excavation is not stated. They resemble the bored hole latrine but they could not be bored by hand to so large a diameter. Latrine riars and seat with covers are provided on concrete floors over the pits. Immediately below the floor in each case a branch pipe is taken from the pit and rising sharply terminates in a fly trap situated in daylight outside the latrine enclosure. The value of this device is evidenced by the rapidity with which the traps become filled with flies. [This is in accordance with experience of Field Hygiene Sections operating in other parts of Africa during the present war.]

Care in the siting of pit latrines both from the point of view of possible excessive rise of the water table [a matter which is liable to be overlooked] and from that of the pollution of water supplies is stressed.

Henry H. Clay

MACPHERSON (I.) & CLARK (J. M. P.) External Popliteal Paralysis in Malta—*Med Press & Circular* 1943 July 7 pp 15-16

The authors give an account of a peculiar condition of which they have observed ten cases within a year at Malta. All were among combatants seen from the army, two from the navy and one a German prisoner. None was seen among the Maltese troops and none was heard of among the civilian population. The symptoms were numbness over the dorsum of one foot and outer side of the leg with little or no pain soon followed by flapping of the foot [presumably foot-drop] and weakness of movements at the ankle joint. The onset might be sudden or gradual but there was no systemic disturbance. Most of the patients showed tactile anaesthesia and analgesia over the area of distribution of the external popliteal nerve. The electrical reactions of the muscles were normal. Recovery occurred in most cases within four months but anaesthesia might persist for a year or even longer and during the course of the disease transient relapses lasting for a few days might occur.

The authors mention three possible causal factors. (1) Nutritional defects which they rule out because recovery occurred without change of diet except such as was associated with a stay in hospital and because cases were not seen among the Maltese troops who had the same diet as British troops or as they interpret it the apparent immunity of Maltese troops. (2) Infection such as a neurotropic virus comparable with anterior poliomyelitis and encephalitis lethargica [Purely hypothetical]. (3) Trauma possibly local pressure from sitting with legs crossed or from wearing garters. [Arguing on the analogy of the ruling out of nutritional factors because Maltese troops were not affected as they saw only some ten cases in the year the number of immune legcrossers or garter wearers must have been great.] Treatment comprised rest in hospital physiotherapy and the use of a walking-caliper with foot drop stop.

[Perhaps in time of war stress and paper shortage we ought not to look for too much detail but this record is very inadequate. First the title is not well chosen for the authors state that they saw cases exhibiting numbness of the thigh also three with musculo spiral palsy of a similar pattern and probably of the same etiology during the same period and one of serratus magnus palsy which would appear to be of the same etiology as that of the external popliteal paralyses. Again from the clinical aspect no mention is made of the reflexes superficial or deep, nor of the presence or absence of tenderness of muscles to pressure nor the presence or absence of cardiac irregularity. Thirdly the question of possible toxin is not referred to except incidentally that punctate basophilia was not seen. Also one would like to know how searching was the inquiry made before they came to the conclusion that civilians were immune. Possible error or deficiency in diet is ruled out on very slight grounds. The people may have been living on a border line diet and the stress of military life or the anxieties of constant or frequent raids may have precipitated the symptoms in the more susceptible. One would like to know the results of trial of thiamin in treatment or other constituent of Vitamin B complex for these neuritic conditions are strongly suggestive of pre beriberi or pre pellagrous states. It is to be hoped that opportunity may occur for more thorough investigation of this interesting disease or symptom complex.]

H Harold Scott

VILÉN (A F) Contribution à la discussion de la paraplégie spastique epidémique du Kwango [On the Epidemic Spastic Paralysis of the Congo]—*Ann Soc Belge de Med Trop* 1942 Dec 31 Vol 22 No 4 pp 309-317 With 1 plate

This which usually starts with fever is characterized by paralysis sometimes flaccid sometimes (and in later stages more often) spastic. The author mentions with details two cases one ending fatally. This was in a boy of five years whose illness began abruptly with fever headache and cough. Three days later weakness of leg and neck muscles and later the same day he was able to move only his arms and toes the legs were otherwise in complete flaccid paralysis. Patellar plantar and Achilles reflexes all absent on both sides abdominal reflexes marked on the left absent on the right. Lumbar puncture revealed little of importance 30 cells per cmm chiefly mononuclears. He died on the eighth day of illness. Nothing remarkable was found at autopsy. There was an atelectatic state of the left lung the vessels of the basal ganglia showed perivascular lymphocytic infiltration and the pathological diagnosis of acute inflammatory encephalomyelitis was made.

The second case was in a boy of 14 months the clinical symptoms were very similar and when the author left the Congo 13 months later the child's legs were still spastic and the diagnosis made was suspected acute anterior poliomyelitis [But in this disease the paralysis is not spastic.]

The account adds little to the paper by G TROLLI [see this *Bulletin* 1939 Vol 36 p 501] and the cause is still unknown. To determine whether these are aberrant cases of acute anterior poliomyelitis or not it will be necessary to search for the virus.

H Harold Scott

DESANCTI (Adolph G.) & DI SANT AGNESE (Paul A.) Tick Paralysis (Report of a Case in New York) — *Jl Amer Med Assoc* 1943 May 8 Vol 122 No 2 pp 86-88

Tick paralysis has been known for almost thirty years but up to five years ago was thought not to occur outside Canada and the north western United States and to be caused by *Dermacentor andersoni* only. Since then cases have been found associated with *D. variabilis* an American dog tick. The present case is of interest because the patient a girl of three years was infected in Huntington Long Island. On July 26th 1942 an insect was with difficulty removed from behind the child's right ear. On the 29th she was tired and would not play or walk. Next day she was ataxic without muscular weakness. The symptoms varied in severity during the next week or so but there was no real paralysis. On August 9th a female *D. variabilis* was removed from the back of the child's head and was found to be dead on arrival for identification at the local Health Institute. Within a few hours the improvement in the child's condition was remarkable and in 48 hours the ataxia had disappeared.

Diagnosis has to be made from anterior poliomyelitis and from peripheral neuritis. The symptoms in this case were mild—they may be fatal after convulsive attacks—and this is thought to point to the bite of the dog tick *D. variabilis* causing disease of less severity than that of *D. andersoni*. [It may be that in this case the tick was dead or moribund and had injected only a small quantity of toxin. Nothing is said as to its being alive on removal. It was dead on reaching the laboratory.] Dog ticks are very common on Long Island so it is difficult to see why tick paralysis is rare. In future doubtless practitioners will remember the facts and like those in British Columbia will always look for ticks on a child who has had convulsions or who presents ataxic symptoms of obscure origin.

H. Harold Scott

McCARTNEY (James L.) Tropical Neuropsychiatry — *Har Medicine* Chicago 1943 Apr Vol 3 No 4 pp 351-366 With 4 figs [Ref. in footnote 1]

This article is difficult to abstract partly on account of its diffuseness partly by reason of the peculiar interpretation which the author has given or at least applied to the term neuropsychiatry. He starts by calling attention to the fact that many a man being sent to the tropics climate to which some are certainly unfitted that they may fall victim to so-called tropical diseases and present neuropsychiatric sequelae of them. With this all will be prepared to agree. He quotes figures of 15 years ago showing that 36.7 per cent of American missionaries in tropical countries were sent home on leave on account of neuropsychiatric disturbances. A certain proportion at least of these were of the emotional type to start with. It is well known that business firms and Government departments send their employees and officials home from tropical stations at shorter intervals than they do from temperate climates on account of or to prevent tropical neurasthenia and psychasthenia.

The author goes on to discuss or enumerate neuroses or neuropsychiatric results in certain afflictions. Thus he tells us that excessive sweating loss of chlorides and to camps Heat stroke causes giddiness and faintness and heat hyperpyrexia causes headache restlessness delirium and later neurological sequelae irritability.

intolerance of light loss of memory and perhaps suicidal impetus
 Night blindness from over exposure to tropical sunlight may have
 serious consequences in aviators and naval officers if the condition is
 not recognized

He passes next to matters which would not be generally admitted
 as in the domain of neuropsychiatry though on the borderline Under
 these the author places change from home environment and lowering of
 moral standards and intemperance especially sexual with consequent
 exhaustion irritability depression and headaches relieved at first by
 alcohol and so to over indulgence in alcohol to alcoholism Korsakoff's
 syndrome and delirium tremens with hallucinations and insomnia
 Excess of alcohol limits appetite less food is taken and signs of
 vitamin deficiencies appear By this stepping stone he passes on to
 the neuritis of beriberi and the nervous symptoms of pellagra which
 with paraesthesias mental depression lassitude insomnia and a
 tendency to suicide are of intense neuropsychiatric importance From
 this to food poisoning is a natural step and epilepsy from cerebral
 cysticercosis comes into the list Contaminated food is a well known
 cause of diarrhoea and the dysenteries but to regard the latter under
 neuropsychiatry because the erotic fixation is on account of the
 abdominal discomfort the tenesmus and the diarrhoea transferred
 from the genital to the anal zone is a peculiar interpretation of the
 term [It would need a Hogarth to depict adequately this tropical
 term] But this is not all The author now reviews various
 tropical diseases and ranks the ordinary accompanying symptoms
 under the term Thus the toxæmia of ankylostomiasis with debility
 and melancholia aching pains associated with dracontiasis some
 nolerance headache and Herxlied's sign in trypanosomiasis headache
 and pains in the back and limbs in relapsing fever shivering and
 headache in rat bite fever the headache and body pains of yellow fever
 the joint and limb pains of dengue the sweats hyperaesthesia and
 neuralgias of undulant fever the headache of malaria the delirium
 stupor coma and convulsions of the cerebral form the low blood
 pressure of kala azar few would rank these as coming under the term
 tropical neuropsychiatry At the end of his article the author
 refers to leprosy and syphilis both of which are of course of great
 neuropsychiatric importance The subject of neuropsychiatry in the
 tropics whether as a sequela of tropical disease or not is of much
 interest and of great importance but it loses rather than gains interest
 when so wide an interpretation is given to the term]

H Harold Scott

CHABEUF & LINHARD Considerations sur le syndrome ano genital de
 Jersild d'après 120 observations originales [Remarks on the
 Ano Genital Syndrome of Jersild based on 120 Original Studies]—
Rev Sci Med Pharm et l'et de l'Afrique Française Libr
 Brazzaville 1942 Oct Vol 1 No 2 pp 36-50

This article is based on a study of 120 cases of the Jersild syndrome
 in Ayoos French Cameroons Africa After giving a good detailed
 description of the signs symptoms and course of the disease the
 authors discuss carefully the causation under the headings of syphilis
 gonorrhoea soft chancre the Nicolas Favre disease tuberculosis
 streptococcal infection ulcerative granuloma mycosis rectal bilharzia
 cancer irritant enemata and a combination of two or more of these
 they conclude that three quarters of their cases were due to —

TROPICAL DISEASES BULLETIN

Vol 40]

1943

[No 11

SUMMARY OF RECENT ABSTRACTS *

IX LEPROSY

Epidemiology

In *Leprosy in India* (p 851) a Committee under the chairmanship of LOWE have set out schemes for leprosy surveys in India. These cannot here be given in detail but all who are contemplating surveys would do well to read the proposals put forward. Control measures including isolation of patients in homes colonies institutions or villages are also discussed.

LOWE *et al* (p 557) have studied the epidemiology of leprosy in a rural area of Western Bengal over a number of years. There has been little change in type of disease early life is the usual period of onset and definite evidence of contact is usually found. Neural disease only very rarely becomes lepromatous but the majority of adult neural cases were found to be tuberculoid in type.

VERGHESÉ (p 216) reports that in Orissa the examination of 822 629 persons revealed 5 699 [*i.e.* 6.9 per 1 000] to be suffering from leprosy in 1939-40.

RAI (p 217) found an incidence rate of 1.6 per 1 000 in 52 000 people examined in the city of Canton. This is lower than some workers have estimated.

In a detailed field study of leprosy in the Cebu Province of the Philippine Islands GUINTO and RODRIGUEZ (p 216) found an incidence of 19.5 per 1 000. The highest incidence of onset was in young persons below the age of 20 and about one third of the patients gave a history of contact. Most cases are found in overcrowded areas. The same authors (p 217) report that in another part of Cebu the incidence is only 0.45 per 1 000. The explanation of this difference in the rates in a single province is not apparent but there is less overcrowding in the lightly infected area.

Leprosy has been widely prevalent in the Maranhao Province of Brazil since 1826 having appeared first on the coast at St. Louis. ROSSAS (p 218) reports that a recent survey revealed an incidence of

The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin* 1942 v 39. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

[November 1941]

18 per 1 000 The rates quoted by REYTRIEGO (p 218) for part of Argentina vary from 0.35 to 2.43 per 1 000. MIR (p 807) gives an account of leprosy in British Guiana where the disease appears to be decreasing. He points out that this Colony was the first to relax its compulsory segregation laws at the suggestion of the British Empire Leprosy Relief Association and that as a result of the early cases can now be treated as out patients. This has led to larger numbers of patients seeking treatment. COR LÉVES (p 219) estimates that there are 2 000-4 000 lepers in Cuba and notes that it is not uncommon to find several cases in one family. Leprosy exists in Porto Rico but DOTLL *et al* (p 219) indicate that it is not extensive. FAGER (p 802) gives an account of the Federal leprosy institution at Carville Louisiana. ALCOCK and HAWKINS (p 219) note that at the Carville settlement there were in 1941 almost 600 American born patients most of whom gave a history of contact and came from known leprosy areas in the southern States. In Texas there is a concentration of cases of German stock.

4.1 of 21 Pathology

HAYAS (p 220) has conducted an extensive experiment in an attempt to cultivate the leprosy bacillus in a variety of fluid media either aerobically or under partial pressures of CO₂. For a description of the media and techniques the original should be consulted. All the attempts failed.

CHAISSINAND (p 221) has produced nodules in monkeys by inoculation of human leprosy material. These nodules eventually disappeared but it seems that *M. leprae* is not entirely refractory to human leprosy. LE SOUZA ARAJO (p 221) has produced granulomata in skin and muscles of rats and mice injected with acid fast bacilli isolated from skin lesions of human leprosy. The same author (p 803) has found acid fast bacilli in the glands of white rats inoculated with gland juice and gland pus of a leper. The rats were kept many months before being killed. From one of the rats cultures were attempted on Loewenstein's medium and there was growth in pure culture and acid fast bacilli which was not *M. leprae*. The tissues of one rat showed generalized infection with lepromatous lesions. The author suggests that this work should be continued on a larger scale. FIRE (p 221) also has produced nodules in rats by inoculating human leprosy material especially if suspended in mucin. MARCHOUX *et al* (p 804) have also failed to infect hamsters with material from human leprosy nodules. DR BOIS and GAYNOR (p 621) have failed to infect hamsters with material from human leprosy nodules. FIRE (p 223) has made a study of the vascular lesions of leprosy. The bacilli may be found in the endothelium of large vessels and in the smooth muscle of small arteries. Infection appears to spread along the vasa vasorum but foci also originate in perivascular lymph spaces around vessel and also around nerves though they were not demonstrated in the lymphatic vessels themselves.

ARNOLD (p 224) details the principal diagnostic criteria of leprosy: thermal anaesthesia, muscular weakness or paralysis, thickened

nerves positive skin or nose smears histological changes Skin lesions may be of almost any form or may be absent The most important sign is thermal anaesthesia which is almost invariably present DAVEY (p 695) notes how easy it may be to overlook infective leprosy if the well known signs such as thickening of the ears face and skin of the body are absent He mentions a case in which the only evident signs were ill defined areas of pale skin coalescing with each other yet numerous bacilli were present in skin of the body nose and the ears

HENDERSON *et al* (p 767) have found that impression smears of leprotic tissue stained with auramine O and examined by fluorescence microscopy show globi and leprosy bacilli more clearly than when the Ziehl Neelsen method is used

The lepromin test—LOWE and DHARMENDRA (p 227) have confirmed the finding of Fernandez that in cases in which the typical late reaction is given to the injection of lepromin an early but less intense reaction is provoked This early reaction characterized by erythema and oedema may be hastened by breaking down the bacillary bodies of the lepromin by grinding The authors do not think that two separate antigens are responsible for the early and late reactions respectively but that the late result is due to the gradual breaking up of the leprosy bacilli at the site of injection and the early result to bacilli already broken up in the process of preparing the lepromin

DHARMENDRA (p 228) has studied the active principle of lepromin This is present solely in the bacilli and not in the tissues of a nodule it can be obtained in soluble form by breaking up the bacilli separated from the tissues The author fractionated the dried bacillary powder he concludes that no isolated fraction gives a late reaction and that only the protein fraction gives a definite early reaction This early reaction with a pure antigen is present in most cases in which the late reaction occurs it is easy to perform and to read and is as sensitive as the ordinary lepromin test without the disadvantages of a long wait and undesirable late reactions He (p 855) has found that leprosy bacilli provide the active material for the lepromin test that only the protein fraction of these bacilli is definitely antigenic and that it produces only an early reaction There are three protein fractions—acid soluble nucleoprotein and alcohol soluble protein all are active

DHARMENDRA and LOWE (p 856) show that three clinical types of reaction can be caused the classical Mitsuda reaction (nodular) the early erythema followed by the classical reaction and the early erythema alone They believe that the bacillary protein is the cause of all these reactions giving the early result if freely available and the late result if not free except as a result of breaking down of the bacilli in the tissues

The late reaction is not produced when any of the isolated fractions or the residues of the bacilli are injected Tests with isolated antigens give results equal to the classical test and have advantages of speed and avoidance of ulceration and the authors consider that tests with these antigens should replace those with ordinary lepromin These observations bring the lepromin test more into line with the allergic skin tests

The same authors (p 857) discuss the antigens used by other workers for the lepromin test

DHARMENDRA and LOWE (p 696) followed the lepromin test by weekly readings for six weeks in 660 cases of leprosy No definitely

positive result was obtained in lepromatous cases 43 per cent of neural simple 73 per cent of neural anaesthetic and 74 per cent of neural tuberculoid cases were positive. Besides these a number were classed as weakly positive in all groups. The presence of leprosy bacilli in the lesions is associated with a high incidence of negative reactions the bacteriologically negative cases give more positive results to the test. The reaction is therefore of value in prognosis.

DHARMENDRA and JAIKARIA (p 226) have used lepromin for testing healthy person in an area of high leprosy endemicity in Bengal and in part of the Punjab in which leprosy was rare or absent. Positive results in Bengal were found in 59 per cent (100 per cent in the higher age groups) but in only 36 per cent in the Punjab. Tuberculin tests were also carried out and the proportion of positive result was found to increase with age. In view of the fact that positive lepromin tests have been found in persons in whom the chances of exposure to leprosy infection are very remote the authors conclude that the reaction may be in part a test of non specific allergy but once exposure to infection does undoubtedly increase the proportion of positive results the test appears to be influenced by allergy. They state that the classical test does not differentiate these two elements.

DHARMENDRA (p 227) has developed a technique for removing the leprosy bacilli from tissues and of standardizing them to form a lepromin. This has given good results when used for the lepromin test. A different technique with a similar object is described by FERNANDEZ and OLMOS CASTRO (p 227). In their tests a direct relation between the concentration of the bacillary lepromin injected and the intensity of the skin reaction was noted.

HENDERSON (p 766) describes a method for separating intact leprosy bacilli from leprous tissue by shaking an emulsion of homogenized tissue in which most of the tissue cells were disrupted but the bacilli intact with olive oil and centrifuging. The bacilli were found in the layer between the oil and the water.

Other tests —DHARMENDRA (p 240) has investigated the complement fixing power of leprous sera after absorption with various acid fast organisms including leprosy bacilli from a nodule. The experiments afforded no proof of the specificity of any of the bacilli and such tests are not likely to be useful in furnishing evidence for or against the genuineness of culture of acid fast bacteria.

GREVAL *et al* (p 225) describe their method of preparing the Witebsky, Klingenstein and Kahn antigen for the complement fixation test in leprosy. GREVAL *et al* (p 461) report on their W. K. K. antigen in leprosy and kala azar. They claim that positive results to this complement fixation test are clear cut and are obtained in early nodular leprosy and in early kala azar before the formalin test is positive. This claim is disputed by LOWE (p 461) who considers the test to be of little use in diagnosis prognosis or epidemiological studies.

FORTE (p 224) reports much the same proportion of positive results to the Wassermann reaction in a group of lepers and a group of apparently non syphilitic controls in Hawaii. He concludes that the test is of little value in differentiating leprosy from syphilis. PATRICK and WOLFE (p 226) have found that false positive results may be given in leprosy with Gaetgen's phenolized cultures of *Spirochaeta pallida* as antigen but not to the same extent as with the Wassermann and Kahn tests.

RUDOLF (p 228) discusses the Rubino reaction [the sedimentation and agglutination of washed formalized sheep red cells in dilutions of the serum of the patient] He concludes that the test is specific in the diagnosis of leprosy in that positive results are extremely rare in other diseases It is especially positive in the more acute forms of the disease [but the highest rate of positive results quoted was no more than 71.7 per cent] Its value in the diagnosis of doubtful suspected cases of leprosy is still however problematical

PESCE (p 623) has found the histamine skin test (which he describes) positive in all anesthetic or maculo anaesthetic areas of lepers but negative in areas of healthy skin and in controls This test is regarded as useful in differentiating leprosy maculae or hypochromic areas from those of vitiligo pinta and the like

MOISER (p 696) writes of Muir's potassium iodide provocation test in leprosy it should be used only in patients in good condition and in spite of some unreliability is still considered to be of value as a guide in deciding on the discharge of patients

ALBARRACIN (p 558) describes a case of apparently spontaneous cure in neural leprosy and remarks that in one area of Colombia the disease is probably undergoing change as though the subjects were acquiring some immunity against it

Treatment

COLE and CARDOSO (p 229) have estimated the percentage composition of the various fatty acids in the chaulmoogra oils from *Hydnocarpus wightiana* *H. anthelmintica* and *Tarakogenos kurii* They discuss the value of these oils in view of their different content of goaric and hydnocarpic acids [ROGERS found the latter to be the most effective fraction of the oils]

CHAUSSINAND and GUILLERM (p 230) write favourably of the action of the sodium soap of *H. anthelmintica* oil given orally and continued if necessary for years to patients in the early stages of disease For those needing more active treatment the ethyl esters are preferred for injection by several routes but preferably into muscle By these means remarkable results have been achieved at little cost They note that segregation laws even if they are not rigorously enforced tend to cause the concealment of disease these should be suspended except for those who refuse dispensary treatment and who are dangerous to the community

Collier's diphtheria toxoid treatment is reported on by several workers The general opinion appears to be that the favourable results recorded from Thailand have not been confirmed in other countries MCKEAN (p 231) has given this treatment in Thailand He admits the limitations of the method but states that the best results are obtained in tuberculoid cases with few bacilli and in early neural cases These are the types of disease in which chaulmoogra treatment is most useful Early lepromatous cases showed good results at first but there were some relapses The treatment was of no value in major tuberculoid disease with numerous bacilli in papular lepromatous disease or in active minor tuberculoid disease COLLIER (p 231) reports four cases in which the administration of diphtheria toxoid was followed by relief of pain in cases of enlarged nerves due to leprosy He maintains that this treatment has given satisfactory results in over 300 cases

DAVISON and GRASSET (p 237) on the other hand have failed to confirm the findings of the Thailand workers on the benefit of the diphtheria toxoid treatment of leprosy except in a small proportion of neural cases such as would be expected to improve under treatment with chaulmoogra. They discuss the theory advanced by the Thailand investigators that there is a predisposing suprarenal inefficiency in leprosy and report that they have found no evidence of this even after a special enquiry. DE SOLZA ARAUJO (p 462) has also conducted a trial of the diphtheria toxoid treatment but without any particularly good results. CHATTERJEE (p 697) also has failed to find any value in the diphtheria toxoid treatment of leprosy. FAGET and JOHANSEN (p 698) similarly report failures at the Carville institution.

Among several points noted in the Annual Report of the Madras Provincial Council of the British Empire Leprosy Relief Association (p 229) are that sulphapyridine may produce severe febrile reactions without benefit and is therefore contraindicated in leprosy and that the diphtheria antitoxin and toxoid method of treatment did not confirm the claims of its originators.

PALDROK (p 467) writes of the value of treatment of lepromata by the local application of rods of solid carbon dioxide. In his view the cold thus induced destroys the covering envelope of the leprosy bacillus (which he regards as a fungus) and allows the products of decomposition to be absorbed and to provoke the formation of antibodies. If after treatment in this way for two years or so the body loses its capacity to respond to CO₂, a new chemotherapeutic stimulus must be used and for this purpose he advocates solganol. The treatment is reported to achieve considerable success provided that good food and hygiene, adequate exercise and weekly sweat baths are insisted upon. He has used these methods in Estonia.

ALBERTO CASTRO (p 623) has used injections of acetyl choline and insulin in the treatment of perforating ulcers in leprosy, the former for its vasodilator action and the latter for its power of stimulation and of fixing albuminoid substances in the body. He claims good results. Details of the method of injection are given.

Control

DAVEY (p 850) reports on the very effective control measures which are being undertaken in the Owerri Province of S. Nigeria around the Uzuakol settlement. In this area infection rates vary from 1.3 to 15.2 per cent. Over 1,000 patients are isolated in the settlement, 2,000 others are isolated (voluntarily) in model leper villages constructed on sites provided free by the local chiefs. These villages have land for cultivation. There are 29 clinics at which over 7,000 cases receive treatment, most of these are in the early stages. In many areas complete control of all cases has been achieved first by starting clinics for treatment and then when confidence has been established by conducting house surveys. There are over 70 trained male nurses in the scheme together with a number of educated native leprosy workers and a few members of the Toc H organization. The whole work is supervised by two medical officers. The scheme is very economical and could be even more widely extended by the provision of more workers and of moderate funds.

BLOSS (p 851) writes of the La Ranou settlement in the Sudan where there are almost 1,000 inpatients, 1,400 outpatients are

dealt with at dispensaries in the Yambio sub district. The incidence of leprosy in this area is about 4 per cent.

BUNGELER (p. 622) has observed for 13 years 300 children of leprosy parents who were separated from their parents at a very early age in none did leprosy develop. He also made histological examinations of the organs of 60 infants of leprotic mothers without finding any evidence of congenital infection. The early separation of infants from infected mothers is therefore an effective preventive measure.

Charles W. Stoeckli

MALARIA

CAJSEY O. R. PENIDO H. M. & DEANE L. M. Observations on Malaria in the Presence and Absence of *Anopheles gambiae* in an Experimental Area (Cumbe) Ceará Brazil. *Amer. J. Trop. Med.* 1943 Jan. v. 23 No. 1 59-71.

During the execution of the programme for the eradication of *A. gambiae* in Brazil the district of Cumbe was set aside for experimental studies. Cumbe an isolated locality in the lower Jaguaribe Valley has a population of about 300 living in an area of 1.6 square kilometres. Prior to 1938 Cumbe was almost free of malaria then *A. gambiae* came. In September 1939 the parasite index was 39.6 per cent in spite of the facts that 960 doses of drugs had been administered to the population during the preceding six weeks and that during the previous seven months Paris green had been applied to some of the water collections. In September the use of Paris green was suspended and medication was reduced. In January 1940 regular studies on mosquitoes and malaria were begun. Mosquitoes were unmolested except for the hand collection of adults during a ten minute search of every room about six times a month and the routine collection of a few larvae. The entire population was interviewed monthly and changes in parasite and spleen rates were recorded. The extermination of *A. gambiae* was begun in May. During the first four months *A. gambiae* density, parasite rates and spleen rates rose together. Radical measures were followed by a fall in the parasite rate from 85.7 per cent in April to 20 in June and by a more gradual reduction in the spleen rate from 64.4 per cent in April to 10 in September. There were but small differences in the parasite rates of the different age groups a fact which confirms the report that the area had previously been free of endemic malaria. Spleen rates were higher among children than among adults. In January *P. vivax* was most in evidence. With rising *A. gambiae* density *P. falciparum* infections increased rapidly while *P. vivax* infections decreased slowly. The ratio of gametocyte carriers to cases of malaria remained fairly constant throughout the period of observation.

Norman White

HUFF C. G. COULSTON F. & CANTRELL W. Malarial Cryptozoites. *Science* 1943 Mar. 26 286.

The authors point out that in discussions regarding the development of malarial sporozoites after their entry into the body of the vertebrate host difficulties arise owing to the lack of a satisfactory name for the

early stages. They accordingly introduce the term cryptozoite for the first generation of malarial parasite developing from a sporozoite. This stage is exoerythrocytic and may be a uninucleate form, a multinucleate form or a schizont. It is possible that in some malarial parasites the sporozoites will be found to enter directly into the red blood corpuscle as SCHAUDINN claimed for *Plasmodium inax* in which case there would be no cryptozoites in the cycle of such a species. The cryptozoite thus covers all stages of development following the entry of the sporozoite into a cell other than an erythrocyte up to the mature schizont which is ready to produce the merozoites of the next generation.

C. M. Wenzon

IRDEM E. Anoph. Sergenti en Turquie [*A. sergenti* in Turkey]
Rev. d'Hyg. et de M. P. Ankara 1941 Aug. v. 17 No. 104 [In Turkish 296-7. French summary (7 lines) 297.]

A. sergenti is reported in Turkey for the first time. Larvae were found in 1940 along with larvae of *A. stephensi* and other mosquitoes in the following localities: Antakya.

C. H.

HADDOW A. J. Measurements of Temperature and Light in Artificial Pools with Reference to the Larval Habitat of *Anopheles (Mysomyia) gambiae* Giles and *A. (M.) funestus* Giles. *Bull. Entom. Res.* 1943 June v. 34 Pt. 2 89-93 2 figs.

Anopheles gambiae breed in water fully exposed to sunlight. *A. funestus*, *A. coustani* and *A. phaeocephalus* usually in water shaded by standing vegetation. In order to compare the conditions of illumination and temperature in these two types of breeding place the author used pans 1 foot in diameter and 6 inches deep, half filled with earth and sunk flush with the ground. One contained clear water, one muddy water, one clear water with growing grass 1 ft. high and one without vegetation was completely shaded by two thicknesses of papyrus matting 1 ft. above the surface. The maximum light intensity in the grassy pool was less than half that in the open pool. With regard to temperature there was no difference between the clear and the muddy water, but the growing vegetation showed an insulating power equal to that of the papyrus matting. The daily range of temperature in the grassy pool (7.0°C) was less than in the Stevenson screen (9.0°C) and far less than in the open pool (15.5°C). The grassy pool was cooler by day and warmer by night than the open pool (afternoon maximum grassy pool 27°C, open pool 34.5°C. After midnight minimum grassy pool 10°C, open pool 19°C). [These are the readings in one experiment; a second gave similar results.] Thus not only do the breeding places of *A. gambiae* reach much higher temperature than those of such species as *A. funestus* but they also undergo much greater temperature fluctuations.

J. B. Whittlesworth

LEVER R. J. A. W. The Malarial Mosquito of Melanesia. *A. scutellaris* Fyfe. Suva 1941 v. 13 No. 4 116-17 [14 refs.] [Summary taken from *Rev. Appl. Entom.* Ser. B 1943 July v. 31 Pt. 7 131.]

Notes are given on the breeding places of *Anopheles phaeocephalus* Don, the vector of malaria in Melanesia, which is found in the Solomon

Islands and New Hebrides but is not known to be present in Fiji. Within its area of distribution Belep alone is free of it while malaria occurs in Aneityum just south of 20° S lat. The Anopheline and malaria first appeared in Rennell between 1933 and 1937. As its larvae have been taken in widely differing kinds of water and even in hot springs it could easily find suitable breeding places in Fiji and the utmost vigilance to prevent its becoming established is necessary, particularly in view of the fact that the chief form of malaria in the Solomon Islands is malignant tertian [*Plasmodium falciparum*].

EYLES D C & BISHOP L K. An Experiment on the Range of Dispersion of *Anopheles quadrimaculatus*. *Amer J Hyg* 1943 May v 37 No 3 239-45 1 fig.

In an experiment in the neighbourhood of Reelfoot Lake Tennessee the authors collected some 16 500 *Anopheles quadrimaculatus* dusted them with fine aluminium powder released them at a given point and then examined all mosquitoes captured during the ensuing twelve days at a series of stations extending up to 2.75 miles from the point of release. Thirty-one females were recovered at a distance of 2.0 to 2.5 miles one male was recovered at a distance of 2.0 miles. The mosquitoes were collected in lamp chimneys with the narrow end open and the wide end covered with bobinet and connected to a small electric vacuum cleaner. They were dusted by closing both ends of the lamp chimney with cardboard disks blowing in the fine metallic dust and sucking the mosquitoes gently for a few minutes.

V B Wigglesworth

BANG F B QUINBY G E & SIMPSON T W. Studies on *Anopheles walkeri* Theobald conducted at Reelfoot Lake Tennessee 1935-1941. *Amer J Trop Med* 1943 Mar v 23 No 2 247-73 18 figs & 1 pl. [20 refs.]

Anopheles walkeri occurs in most of the eastern United States but is usually rather uncommon. At the Reelfoot Lake Tennessee however it is abundant forming 38.5 per cent of the adult anophelines collected in light traps during the investigations here described. It breeds in water with dense emergent vegetation. It could be taken in light traps at distances of 1½ and 2 miles from the nearest breeding places. The adults rest by day in dark humid places sometimes near the moist floor of barns but most commonly upon the dark shaded bases of vegetation growing in water or wet mud. Experiments on the entry of adult females into houses showed that the presence of artificial light was the attractive factor. The presence or absence of human beings seemed to have no influence on the numbers entering. The introduction of electric light in rural areas may thus favour the entry of this mosquito into houses and may cause it to become a malaria carrier of some importance. In the present survey a single specimen out of 2 003 was found infected with an unidentified species of *Plasmodium*. *A. walkeri* usually occurs alongside *A. quadrimaculatus* which is a more hardy species and probably far more important as a vector of malaria. These two species are very similar. The authors describe several new distinguishing characters the most useful being the halteres which are entirely light scaled in *A. walkeri* and have light stems with black knobs in *A. quadrimaculatus*.

V B Wigglesworth

of the attack subsequently they dominated the clinical picture. An organic psychosis developed. Aphasia, alexia, agraphia, memory defect and mental confusion were associated with involvement of the pyramidal tract. The malaria infection responded to atabrin but the symptoms persisted for some time. It was three months after the onset of the first febrile attack that the patient was finally discharged from hospital. He made a good recovery. *Norman White*

DE SARAY, G. S. W. & TOWNSEND, R. F. Spontaneous Rupture of the Spleen in Malignant Tertian Malaria. *Lancet* 1943 May 8 584-5

This is the record of an unusual case. A man aged 21 was admitted to hospital suffering from an attack of *P. falciparum* malaria. His general condition was good on admission. The spleen was not palpable. On the following afternoon he had a severe attack of vomiting. Soon after he complained of abdominal discomfort not amounting to pain and passed several stools. A quarter of an hour later he was collapsed, pulseless, cyanosed and semi-conscious. The abdomen was relaxed. Restlessness and air hunger suggesting a major haemorrhage preceded death. His condition did not warrant any form of operative treatment. Post mortem a subcapsular blood clot extended over the whole surface of the spleen; there was a tear two inches long in the upper part of the outer side of the capsule and about 60 pints of blood were found in the peritoneal cavity. The absence of any history of trauma, the absence of localizing signs of the subcapsular haemorrhage and the late and sudden onset of signs of extensive abdominal haemorrhage are unusual features of this case. *Norman White*

DE GROOT, A. The Kahn Verification Test in Malaria. *J. Lab. & Clin. Med.* 1943 Apr. 28 No 7 88-5

Kahn Standard Presumptive and Verification tests [*Bull. of Hyg.* 1940 v 15 641 1941 v 16 241 and 480 1942 v 17 440] were applied in Kahn's laboratory to the sera of 18 malarial clinically non-syphilitic patients. The Standard test gave positive reactions with seven and doubtful reaction with one; the Presumptive test gave positive reactions with 10 and the Verification test gave positive reactions of the general biologic type (positive at 0°C but negative at 37°C) with all but four. One of the four gave an inconclusive reaction with the Verification test (positive with the other two tests) and the other three were negative with all three tests.

Serial tests of the sera from the seven patients who had given positive reactions with the Standard Kahn showed that all became negative in from one to three months; this being fair evidence that the reaction was not due to syphilis. During this time the general biologic type of reaction persisted after the reaction to the Standard test had become negative but in all but one subject the final reaction to the Verification test was negative. The general biologic type of reaction was given by the sera from four patients which had been positive in some degree to the Presumptive test but eventually all became negative. Two non-malarial febrile patients gave general biologic reactions; one was negative to the other two Kahn tests and one with an acute respiratory infection was at first positive becoming negative later.

L. H. Harrison

BRODIE B B & UDENFRIEND S The Estimation of Quinine in Human Plasma with a Note on the Estimation of Quinidine *J Pharm & Exper Therap* 1943 June v 78 No 2 154-8

A simple precise method is described for the estimation of quinine in human plasma. One part of plasma is diluted with 39 parts of water and 10 parts of 20 per cent metaphosphoric acid are added with vigorous shaking. After 15 minutes the mixture is centrifuged. The clear supernatant is placed in a Coleman Photofluorometer and compared with a standard solution of quinine. The method includes fluorescent degradation products of quinine if such are present but this error is small and constant: 2-15 per cent average 11 per cent. Concentrations of 1 mgm per litre and higher can be estimated conveniently. Of the other alkaloids of cinchona bark only quinidine fluoresces appreciably; the fluorescence of quinidine is closely similar to that of quinine and the same method may be employed for its estimation.

F Hawking

FRANKS A G & DAVIS M I J Agranulocytosis Complication following Quinine in a Case of Malaria Therapy *Amer J Syph* 1943 May v 27 No 3 314-18 [12 refs]

WINGFIELD A Treatment of Malaria [Correspondence] *Brit Med J* 1943 June 19 770

STEPHENSON R W Dos of Atebrin in Malaria [Correspondence] *Ibid* 770

Wingfield has used the following treatment for subtertian malaria. Two daily intramuscular injections of quinine (solvochin) for four days followed by mepacrine 0.1 gm thrice daily for seven days and after a short interval by pamaquin 0.01 gm thrice daily for three days. This produces defervescence of the fever within 72 hours and saves quinine; the solvochin injections are almost painless.

Stephenson advocates large doses of atebrin [mepacrine] and has given this drug in many hundreds of cases in the following dosage: First dose 0.3 gm if possible between paroxysms; second dose 0.3 gm given six hours after the first; second and third days 0.2 gm morning and evening; fourth to sixth day (inclusive) 0.1 gm thrice daily. With this treatment pyrexia is rapidly brought under control; no toxic effects have been encountered and there is evidence that relapses are less common than with the lower doses usually recommended. The author writes from the Sudan where BRYANT has independently reached much the same conclusions [see this *Bulletin* 1942 v 39 666].

C IV

MURRAY J E & SHUTE P G THOMPSON K Drug Control of Malaria [Correspondence] *Lancet* 1943 July 31 142

In this short note the authors insist that mepacrine [atebrin] is at least the equal of quinine in the treatment of subtertian malaria and that it can be given with confidence. In their view 0.6 gm mepacrine is the equivalent of 15 or at most 20 grams of quinine. They emphasize the importance of immediate treatment even if parasites are

mepacrine was comparable in extent to the damage caused by 20 m^g of quinine and the standard dose of quinine intramuscularly is greater than the standard dose of mepacrine

Norman White

FOLHA MEDICA 1943 Feb 25 v 24 No 4 35-6 O Iodomercurato de manganês na profilaxia da malária e na terapêutica das formas crônicas Síntese das recentes experiências realizadas no Nordeste [Man anese Iodo Mercurate in the Prophylaxis of Malaria and in the Treatment of Chronic Cases Synthesis of Recent Experience in the North East of Brazil]

Iodo-mercurate of man^aanese in combination with extract of spleen has been tried out on a fairly extensive scale in the north-east of Brazil and the paper summarizing some of the results achieved speaks in high terms of the value of the remedy as a prophylactic and in the treatment of chronic malaria infections [It will be recalled that the Biochemical Institute of Milan issued an exactly similar preparat on which it called M3 Most of the many reports that have been published do not support the claims that have been made with regard to its value as a prophylactic—the Bulletin 1938 v 30 31 1939 v 36 267 1940 v 37 503 1942 v 39 149] The remedy given in small and increasing doses stimulates the reticulo endothelial system eliminates the parasites sheltering in the spleen and other viscera stimulates haemopoiesis and causes a reduction of the spleno megal^y The resistance to malaria conferred by treatment only becomes apparent some two months after the completion of treatment In cases in which this resistance is insufficient to prevent infection the malaria attacks that develop are of an extremely mild type and readily curable The remedy is of special value in the treatment of chronic cases Such are the conclusions that emerge from the experience of the industrial and other organizations which are related in this paper the unanimity of opinion is remarkable

Norman White

MEZOS M P Mesures antipaludiques dans la construction d grand canal de Ferghana de Staline [Anti Malaria Measures during the Construction of a Large Canal] Med Parasit & Parasitic Dis Mosco 1940 v 9 No 4 384-91 3 graphs [In Russian] [Summary taken from Rev Appl ed Entom Ser B 1943 July v 31 Pt 7 127]

In 1939 a large irrigation canal was constructed between June and December in the region of the upper Sur Dar'ya (eastern Uzbekistan) and the measures that were adopted with considerable success to reduce the spread of malaria among the workmen engaged are reviewed The canal is 10 miles long and passes through a densely populated area with numerous rice fields, as well as swamps and reservoirs all of which are infested with Anopheles larvae Most of the excavation work was carried out in August and September which is the season when the incidence of malaria reaches its peak in Uzbekistan The Anopheles that were observed in those months were Anopheles ph^ocherrimis Theo and A tyrannus Pall which were in general the commonest and A maculipennis var sachoi Favr and A per pict^o Grassi which were the most numerous away from the rice fields The measures taken comprised regular medical treatment of

the workmen the distribution of mosquito nets the application of larvicides over an area of 60 square miles by aeroplane and over smaller areas by hand and periodical drainage of rice fields

NEWBOLD C E & COCHRANE E Control of *A. argyritarsis* by Flushing
Caribbean Med J 1943 v 5 No 2 91-2

TRAGER W The Influence of Biotin upon Susceptibility to Malaria
J Exper Med 1943 June 1 v 77 No 6 557-82 11 charts & 4 figs on 2 pls [47 refs]

Individuals are believed to differ in their susceptibility to malaria. The importance of nutritional status has been emphasized in this connexion but the influence of any particular factor has not been determined. The only definite experimental evidence on the effect of nutritional status is that of PASSMORE and SOMMERVILLE [this *Bulletin* 1941 v 38 p 646] who found that infected monkeys kept on a deficient diet did not develop more severe malaria than control animals kept on an adequate diet.

In the present investigation the influence of different levels of biotin in the blood of ducks and chickens on their susceptibility to *P. lophurae* infection and likewise of ducks to *P. cathemerium* infection has been studied with in some cases a concomitant condition of pantothenic acid deficiency. The influence of administered biotin on the course of malarial infections in ducks was also studied.

The chickens and ducks were rendered biotin deficient by feeding them on a diet containing a large proportion of dried egg white and the features of the resulting syndrome in these birds are illustrated by photographs. Control birds were given biotin by mouth or parenterally or alternatively the egg white was replaced by casein. A description of the various diets is given. When biotin deficiency was apparent the birds were inoculated with numbers of malaria parasites proportional to body weight care being taken that the blood volume and rbc counts were approximately the same in experimental and control animals in order to ensure accurate comparison of subsequent parasite counts. Assays of the blood biotin level were made at the start and during the course of the experiment by a microbiological method.

The investigation showed that biotin deficient chickens and ducks infected with *P. lophurae* had more severe infections than non deficient birds and biotin deficient ducks also showed increased susceptibility to *P. cathemerium* infection. On the other hand marked pantothenate deficiency was without effect. In birds infected with *P. lophurae* the biotin level of plasma and of red blood cells rose and fell with the numbers of parasites present. While administration of biotin to birds with partial deficiency of this substance lessened the severity of *P. lophurae* infections it failed to influence the infection in non deficient birds which possibly excreted the excess biotin more rapidly.

Assays of the blood showed that *P. lophurae* infection in chickens and ducks modified the biotin level for a time and the author suggests that this substance may be mobilized in the blood from other tissues and show activity by reducing the number of parasites. Moreover since plasma biotin in chickens infected with *P. lophurae* rises more rapidly and to a higher level than in ducks we may here have an explanation of the fact that chickens at a certain age get rid of their

infections more quickly. Increases in plasma biotin were not due to the anaemia following malarial infections. Phenylhydrazine can raise the biotin level of plasma and chicken infected with *P. lophurae* when treated with this substance have been shown to develop less severe infections than control birds, a fact which may be connected with the preference of this parasite for mature erythrocyte or in the author's view to increase in level of plasma biotin. On the other hand canaries infected with *P. cillinerii* have more severe infections following treatment with phenylhydrazine. It is possible that the preference shown by different species of malaria parasites for old or young red cells may be associated with the different biotin content of these cells. A simple theory in explanation of the author's results is that biotin is an essential growth factor for malarial parasites with a certain optimal range of concentration. He points out however that much more experimental work is required. The specific relationship between certain nutritional deficiencies and degree of susceptibility of the host to various other infections is discussed.

The yeast growth substance biotin first isolated from *C. volkii* by BLOCH has been shown by DE VIGNEAUD and collaborators to be identical with vitamin H. The name was given by GEORGI to the factor preventing liver yeast and various foods which was capable of preventing the fatal syndrome which results from the giving of large amounts of raw egg white to all species studied. Biotin was shown to be involved in animal metabolism and came to be recognized as a member of the vitamin B complex. Its rôle in nutrition is not yet fully known. DE VIGNEAUD 1941 and his collaborators suggested the chemical structure of this substance and HARRIS *et al.* 1943 very recently showed by a total synthesis of biotin that the assumed formula is correct.

J. D. FILLON

BLACKWATER FEVER

MAE KATH B. G. MARTIN, N. H. FINDLAY, G. M. The Mechanism of Red Blood Cell Destruction. *Brit J Exptl Pathol* 1943 Apr 24 No 2 258-63

A 10 per cent suspension of washed red cells from monkey or guinea pig was made in sterile 0.85 per cent saline with or without 5 per cent glucose or buffered phosphate. Slices of various tissues (4 mm x 4 mm x 2 mm) from an exsanguinated homologous animal then washed in fluid corresponding to that used for suspending the red cells. On incubating the cell suspension (1 cc) at 37°C in the presence of the slices of washed tissues (in 1 cc of the corresponding fluid) haemolysis occurred. To obtain constant results strict aseptic chemical cleanliness and a pH of 7.1 were necessary conditions; the tissues were also kept on ice in the interval between removal and use. For the following reasons it was considered that the haemolysis was produced by an enzyme—an erythrocytase—from the tissues. First the time relations of the lysis were similar to those of an enzyme-substrate reaction; the rate of lysis being slow at first then more rapid for a few hours being maximal between the 15th and 24th hours and

finally becoming slow again. secondly lysis was prevented by the previous heating of the tissues to 80 C. thirdly traces of potassium cyanide or low concentrations of mercuric chloride inhibited the lysis and fourthly the lytic agent was found to be species specific and to be inhibited by titrable concentrations of serum. It seems unlikely that the lytic agent was only a product of tissue autolysis because after dissection the tissues were used as soon as possible—always within two hours during which time they were kept on ice. also the lytic agent appeared to be species-specific and was inhibited by serum. Further more tissues removed after having been 18 hours in a haemolytic system produced lysis in a fresh system in the same time as did fresh tissues. Finally terminal washings from intact animals contained the lytic agent. In the circulating blood and in unwashed tissues there was a non species-specific inhibiting factor which inhibited the activity of the tissue lysin. the inhibiting factor appeared to withstand drying as it was present in reconstituted plasma. The degree of lysis occurring normally in the body may depend on the interaction of lytic agent and inhibitor and disturbances of their balance may be associated with lysis in such conditions as blackwater fever malaria and other lytic anaemias. [For a previous note see this *Bulletin* 1943 v 40 440]

F Murgatroyd

BURK WALL H F. Blackwater Fever. A Statistical Report on Twenty Five Cases seen on Hainan Island. *Amer J Trop Med* 1943 Mar v 23 No 2 285-92 2 figs [18 refs]

Of 25 patients seen on Hainan Island suffering from blackwater fever 24 were natives and all were former residents of Nodoa. All had been subject to frequent attacks of malaria for which they were accustomed to take quinine and in none was any idiosyncrasy to the drug established. There were 15 male patients and 10 female and six were under 15 years of age. A previous attack of blackwater fever had occurred in three patients of whom two died while of those suffering their first attack four died. *P. falciparum* was found in 17 of the patients. Treatment of the blackwater fever included rest fluids alkalis and haematinics. Atebrin 0.1 gm twice daily was given to 15 patients for the first three days when haemoglobinuria was present while some received quinine 5 grains intramuscularly on entry into hospital and in increasing doses by mouth when the urine had cleared. Among a total of 913 patients admitted to the hospital between April 1st 1940 and February 1st 1942 there were 325 suffering from malaria without blackwater fever and 22 from blackwater fever.

F Murgatroyd

LEISHMANIASIS

VILANOVA J Fundamentos técnica y resultados obtenidos en el tratamiento intralesional del boton de Oriente con un nuevo preparado de antimoniato a alta concentracion [Technique and Results of Infiltration of Oriental Sore with a New Antimonial Preparation] *Rev Clin Espanola* 1943 Jan 15 v 8 No 1 21-8 3 figs

The author having noted that the local treatment of oriental sore by infiltrating the lesion with a solution of atabrin as recommended by FLAHER [this *Bulletin* 1939 v 36 454] was liable to be followed by serious local reaction was led to substitute solustibosan in an attempt to discover a less irritating solution for local injection. After some experimentation he found that a new concentrated form of solustibosan which contains 100 mgm of pentavalent antimony in place of the usual 20 mgm per cc gives very satisfactory results. The dose employed is 0.4 cc per 10 kgm of body weight but a total dose of 2 cc must not be exceeded. If there are not more than three sores this quantity may be sufficient to infiltrate completely all the lesions at one operation but in young patients with a body weight of not more than 10 kgm infiltration will have to be undertaken on more than one occasion if more than one sore is present. If many sores are present local treatment is hardly feasible. In such cases the author prefers generalized treatment with injections of fousadin or neostibosan. Though the local treatment is not entirely free from pain it has the great advantage that the injections into the sore have to be given only once. The parasites disappear from the sore in 24 hours and without further interference healing with little and inconspicuous scarring takes place in two or three months.

C. M. Henyon

FEVERS OF THE TYPHUS GROUP

PHILIP C. B. Nomenclature of the Pathogenic Rickettsiae *Amer J Hyg* 1943 May v 37 No 3 301-9 [38 refs]

This is a very interesting discussion on the nomenclature of the Rickettsiae of the fevers of the typhus group. The author makes no claim to finality for the names suggested because information about the organisms and the diseases caused by them is still incomplete. The numerous names that have been proposed are critically examined and an effort is made to select those that conform to the accepted rules of nomenclature. It is not practicable to give an adequate abstract of the contents of the paper but the following summary of the classification proposed by the author is of general interest. The classification is associated with the arthropod vectors concerned in the transmission of the various Rickettsiae.

TABLE

Family Rickettsiace Pinkerton 1936

Rickettsia

R. prowazekii
da Rocha Lima 1910
(of the typhus fever group)

R. orientalis
Nagayo et al 1930
(of the tsutsugamushi fever group)

R. prowazekii
(of epidemic typhus)
R. typhi
Wolbach and Todd 1930
(of endemic typhus)

Nil

D. rickettsi
(of Rocky Mountain
Brazilian and Colom-
bian spotted fevers)

D. conori
Brumpt 1932
(of boutonneuse fever
Kenya typhus and
tick bite fever)

The original name was *Dermacentroxenus typhi*
† The original names were *Rickettsia bi-nodis* and *R. disporica*

Genus Rickettsia da Rocha Lima 1916

Dermacentroxenus
Wolbach 1919

D. rickettsi
Wolbach 1919
(of the Rocky Mountain
spotted fever group)

Coxiella
Philips 1943
(of the Q fever group)
C. burnetii
Derrick 1939
(synonym *C. disporica*
Cox 1939)

Nil

Sub-
species

Species

Subspecies

Among the numerous synonyms for the Rickettsia of endemic flea borne typhus the name *Rickettsia typhi* is regarded as having priority. The name *Dermacentroxenus typhi* was given by WOLBACH and TODD in 1920 to the parasite of Mexican typhus which is commonly regarded as being the same as endemic typhus. As the organism is a true Rickettsia the name is perfectly valid transferred to Rickettsia and becomes *R. typhi* (Wolbach and Todd) or *R. prowazekii* sub-species *typhi* (Wolbach and Todd).

The name *Dermacentroxenus* is adopted for the organisms of the fevers of the Rocky Mountain spotted fever type apparently on the assumption that these organisms because of their intranuclear habitat are properly regarded as belonging to a separate sub-genus of the genus *Rickettsia*.

The name *R. orientalis* given to the mite borne Rickettsiae is likely to meet with general acceptance. There will be differences of opinion about the necessity for establishing a new sub-genus for the organisms of Q fever in spite of the fact that this parasite differs from the other Rickettsiae in being consistently filter passing and in causing a disease without rash and without a fulminant form for any of the known forms of Proteus.

[It is surprising to learn that observance of the rules of nomenclature necessitates consideration for such unsuitable names as *R. meaurioi*, *R. pypers* and *R. megawii* as *fl tickers* proposed by AMARAL and MONTEIRO in 1930. The author happily finds justification for the view that they may be sunk for the present as being presumably synonyms of the earlier names *R. conori* and *R. orientalis*.

Unless clear evidence is produced that the Rickettsiae of the typhus group comprise separate subgenera most workers will prefer to use the widely accepted nomenclature and call the organisms *Rickettsia prowazekii*, *R. mooseri*, *R. orientalis*, *R. ricketts* and *R. burnetti* adding when necessary subtitles to indicate varietal differences.

If names like *Dermacentrocnis* and *Coxiella* are accepted it will be necessary to make a drastic revision of the nomenclature of the Rickettsiae in general. As the reviewer has already pointed out it would be anomalous to use the name *Rickettsia quintana* for the parasite of trench fever and the name *Dermacentroxenus tickettsi* for that of tick borne typhus fever. The subdivision of the genus Rickettsia into subgenera would therefore involve the use of a new subgeneric name for the organism of trench fever. This might be *Fissilis quintana* but it is to be hoped that this complication may be avoided.

The author excludes the tick typhus of India from the list of tick borne Rickettsial fevers on the ground that the disease is more recently thought to be mite borne. Presumably he has not seen the original accounts of the disease by the reviewer or the other clear evidence of the occurrence of tick borne typhus in India. Mite borne typhus and also flea borne typhus almost certainly occur in India but the evidence that foci of tick typhus also exist is even stronger though much of it is more than twenty years old. It would be very surprising if any of the fevers of the typhus group were found to be absent from the sub-continent of India with its great range of climatic conditions and its geographical situation between the Near and the Far East.

In spite of the debatable points the paper is a valuable contribution to the nomenclature and classification of the fevers of the typhus group.]

Johanna D. McAllan

- BAEYER W Geistige Störungen bei Fleckfieber Zugleich ein Beitrag zur Lehre von den Konfabulationen [Mental Disturbances in Typhus Fever With a Note on the Confabulatory Psychosis] *Ztschr f d gesamte Neurol u Psychiatrie* 1942 Dec 30 v 175 No 1 & 2 225-55

This article of thirty pages was written by a psychiatrist for psychiatrists. By far the greater part deals with six cases of a confabulatory psychosis in German soldiers convalescing from typhus fever. All the patients gave vivid and circumstantial accounts of imaginary feats of prowess for which five of them claimed to have been rewarded by distinguished decorations and by promotion to commissioned rank or to important posts. The condition resembled Korsakoff's syndrome but apart from the grandiose delusions the mental condition of the patients was normal or only slightly affected.

While under observation some improvement was observed but the after histories are not mentioned. The nature of the psychosis is discussed at great length. Special emphasis is laid on the toxic factor the anatomical changes in the small vessels of the brain are hardly mentioned. The resemblance to poisoning by cannabis indica is noted. Evidently the higher brain centres concerned with self criticism are thrown out of action so that day dreaming wishful thinking and naive fantasies assume uncontrolled mastery.

Brief reference is made to the countless psychic and other nervous disturbances seen during the acute stage of the disease and in early convalescence. Among those mentioned are apathy somnolence coma delirium—sometimes low muttering sometimes violent—loss of orientation in time and place insomnia coma vigil catalepsy tics muscular twitching choreiform movements incoordination Parkinsonism mutism deafness hypochondriasis depressive or anxiety states expansive euphoria embolic hemiplegia optical and auditory hallucinations paranoia schizophrenic symptoms suicidal impulses etc. One patient temporarily assumed the personality of a friend including his birthplace previous occupation religion etc.

Most of the psychoses are due to encephalitis none of them with the possible exception of confabulosis is specifically connected with typhus fever though mental aberrations are exceptionally frequent in typhus and tend to persist for some time after defervescence. [The article contains internal evidence suggesting that the author has had extensive recent experience of typhus fever in German soldiers.]

John W D Megaw

- LAMPERT H Der Blutdruck Fleckfieberkranker und seine Beeinflussung durch das Ueberwärmungsbad [The Blood Pressure of Typhus Patients and how it is affected by the Hot-Bath Treatment] *Deut med Woch* 1943 Jan 15 v 69 No 2 33-4 4 figs

This article has presumably been written as an answer to criticism directed against the hot bath treatment which was advocated in a paper by the author who stated that he had already administered more than 2 500 hot baths [see this *Bulletin* 1942 v 39 p 824].

LAURENTIUS in a later paper raised the objection that hot baths would cause a dangerous fall in the blood pressure. He also opposed the author's view that collapse of the peripheral circulation rather than heart failure was the chief cause of death in typhus [see this *Bulletin* 1943 v 40 44b].

the equator having a mean temperature of 77 F and a rainfall of about 90 inches.

Few cases were seen at the Pasteur Institute in 1941 but in previous years numerous cases had been observed they were regarded as being of the murine type though complete proof was lacking. MOUSTARDIER in 1941 reported a case which he regarded as murine but he stated that he had observed a good many cases believed to be tick borne (see this *bullet* 1943 v. 40 p. 94).

Of the five cases of typhus like fever seen in 1941 two gave negative Weil-Felix reaction, and negative results to guinea pig inoculation. In one *Pro. 15 OVI9* was agglutinated 1-100 but no animal experiment was carried out.

An indigenous patient had fever lasting three weeks. No rash could be seen. The agglutination responses on the 22nd day were—to *OVI9* —1-200 —1-500 and —1-1000 to *OVI2* and *OVI4* —1-500. Two and a half months later the reactions were negative except for a partial response to *OVI9* (1-200). Eight rats from the patient's hut and a *Neotoma* as well as a number of rats from the immediate neighbourhood were investigated by guinea pig inoculation with negative results.

Samples of blood were taken from 15 persons in the vicinity. In one of these there was a positive reaction to *OVI9* 1-200 on three separate occasions. This was attributed to an inapparent attack but guinea pig inoculations on two occasions were negative.

The author concludes from these and previously observed cases that murine typhus is endemic in Brazzaville and that inapparent attacks may occur.

The members of the typhus group of tropical West Africa are still something of an enigma.)

John H. D. Meier

KEY C. R. Murine Typhus Fever Control. *Pub. Health Rep. Wash.* 1943 Apr. 16. S. No. 16 631-8.

During the 10-year period 1932-41 about 20,000 cases of murine typhus fever have been reported in the U.S.A. there were 2,700 cases in 1941 and 3,700 in 1942. The real number must have been much larger. In certain areas a detailed survey showed that only about one fifth of the cases had been notified.

The disease by no means trailing after the age of 60 though prognosis is not good and young patients are acutely ill for two weeks. Convalescence is low lasting nearly 10 months.

Most of the cases are traceable to domestic rats. The disease is far more prevalent in the south where rat infestation is intense and widespread and climatic conditions favour the flea vector. In the north the disease occurs chiefly in large urban communities and rat infestation is restricted to certain buildings which have a dense rat population.

Rat control is on orthodox lines—poisoning as a rule is the least costly method but when food is easily accessible to the animals, poisoning is not so effective. Local and temporary measures of rat control may be adequate in the north but are useless in the south where rat proofing and rat destruction must be thoroughly carried out. Exterior rat proofing if combined with rat destruction is adequate and is much less expensive than complete rat proofing which is a costly

process in old buildings. The work must be done by trained persons preferably by the staff of the public health service

John W D Megaw

PARKER R R KOHLS G M & STEINHAUS E A Rocky Mountain Spotted Fever Spontaneous Infection in the Tick *Amblyomma americanum* *Pub Health Rep Wash* 1943 May 7 v 58 No 19 721-9

The Rickettsia of Rocky Mountain spotted fever has been recovered from a batch of 114 nymphs of *Amblyomma americanum* collected in Oklahoma in September 1942 from vegetation in a wooded pasture close to the home of a child convalescing from spotted fever

The author and others had already recorded cases in which this tick was the probable vector of the disease but the evidence was incomplete. In the present investigation the Rickettsia was recovered from a guineapig on which the nymphal ticks had been fed

The following points connected with the investigation deserve attention some of them ought to correct certain misconceptions which are still current with regard to the tick borne fevers of the typhus group. Of the 15 guineapigs employed in making passages of the Rickettsia none died none had a scrotal reaction and two had no fever. These two must have had inapparent attacks because one of them was afterwards found to be immune to spotted fever and the other to boutonneuse fever. The average duration of the fever in the passage guineapigs was five days. Rickettsiae were found in the cytoplasm of the cells of the infected animals and occasionally appeared to be intranuclear in the cells of the peritoneum and tunica. There was complete reciprocal cross immunity between animals infected with the Rickettsiae and those infected with (a) three virulent strains of Rocky Mountain fever (b) boutonneuse fever and (c) South African tick bite fever and *maculatum* infection [thus *Bulletin* 1940 v 37 254]. Spotted fever vaccine completely protected guinea pigs against the infection and as this vaccine does not protect against boutonneuse or tick bite fever the strain of Rickettsia was clearly of the Rocky Mountain fever type.

Fifteen guineapigs after recovering from epidemic typhus were inoculated with the Rickettsiae six remained afebrile and nine had fever which lasted on the average just over three days. In the reverse test four of twelve animals remained afebrile the others had fever lasting on the average 3.62 days. [This suggests a partial degree of cross immunity between louse borne and tick borne typhus fevers.]

Guineapigs recovered from endemic typhus were susceptible to the Rickettsia infection. In the reverse experiment two of four animals remained afebrile and the other two had fever lasting three and six days.

There was no cross immunity with American Q fever.

The paper contains an account from various sources of two remarkable outbreaks of Rocky Mountain spotted fever. In one all the six members of a household and the visiting physician at Armstrong Oklahoma were attacked within a period of 32 days after bites by ticks which almost certainly were *A. americanum*. In late September a few days after the occurrence of the last attack strains of Rickettsiae having the characteristics of the Rocky Mountain fever type were recovered by HASSLER and his colleagues from pocket gophers (probably

medication of any kind may be contraindicated. R. R. PARKER is quoted as stating in a personal letter that "We have used glucose in guinea pigs with the usual result, namely, earlier deaths than in the control."

[These experiments have an important bearing on the prospects of obtaining an effective antityphus serum and the comments on intravenous medication deserve attention. For work on antityphus serum in North Africa see this *Bulletin* 1942 v. 39 543.]

John W. D. Meade

BORMANN, F. *Febris neuralgica periodica* (Wolhynisches) Fieber
Fünftagesfieber [*Febris Neuralgica Periodica* (Trench Fever)]
Deutsches Med. Woch. 1943 Apr 30 v. 69 No 17/18 306-9 4 charts

Although this paper throws little fresh light on trench fever it gives a good description of the symptoms observed in an epidemic among German soldiers in North Russia during the late autumn and winter of 1941-4.

Prodromal symptoms were rare. The onset was very sudden with rigor or chill and the temperature rose rapidly to 39 or 40 C. In many cases a brief febrile period was followed by sudden desiccation with sweating so that a malarial paroxysm was simulated.

The types of fever observed were —

(1) The abortive short fever type (in about 40 per cent. of the cases) the fever lasted from less than one day up to three days and was followed by complete convalescence within a few days. These cases were usually regarded as influenza.

(2) The classical periodic type (31.5 per cent.) with short paroxysms of fever or waves of low fever which recurred at irregular intervals. The fever free periods usually lasted three to five days. The paroxysm usually, but not always, became progressively less severe and did not exceed five in number.

(3) The persistent fever type (18.5 per cent.) in which the usual initial paroxysm was followed by persistent fever for a period ranging from a week to several months. The fever was sometimes continued, resembling typhoid, sometimes intermittent and sometimes irregular.

(4) The rudimentary type (10 per cent.) in this there was little or no fever but neuralgic pains lasted two to seven days.

The epidemiological conditions and the clinical picture left no room for doubt that all these types are variants of the same disease. [The non-periodic cases were more than twice as numerous as the periodic so that the new name proposed by the author — *febris neuralgica periodica* — seems to be quite as unsuitable as the various other names used by German authors. It has the added disadvantage of being unfamiliar.] Pains in the shin bones or calves occurred in only about half of the cases. The neuralgic or myalgic pains affected various muscle groups; they varied from slight rheumatic pains to severe stabbing or boring pains in the limb, seldom in the joints and occasionally affected only one side of the body. The symptoms sometimes suggested meningismus or renal colic. Most of the patients felt ill and depressed. Splenic enlargement was detected by percussion in about one third of the cases. No eruption was seen. The pains did not always subside during the afebrile intervals, sometimes they became worse.

In the prolonged attacks the patients lost weight and had night sweats in many cases. Occasionally there was a neurasthenic condition

and delayed convalescence. Five cases of second attacks were seen within a period of three and a half months apparently convalescents may harbour the Rickettsiae for many months.

The diseases simulated were—influenza malaria relapsing fever typhus typhoid encephalitis undulant fever tuberculosis muscular rheumatism and chronic septic infection.

The Bessarabia fever described by BOEHNHARDT in 1942 may well have been trench fever.

[BOEHNHARDT (below) describes a fever which never lasted more than a week and in which there were invariably two febrile paroxysms. These features suggest a fever of the dengue group rather than trench fever.]

The epidemiological conditions and the occurrence of some cases of the periodic type give clues to the diagnosis.

No drug has been found to have a specific action.

The source of the infection is considered to have been Russian troops and the local inhabitants among whom the disease exists in endemic form without being recognized.

John W D Megaw

BOEHNHARDT H. Eine eigentümliche Fiebererkrankung in Bessarabien [A Peculiar Febrile Disease in Bessarabia] *Deut Militärart* 1942 May 7 No 5 291-4

An outbreak of a short fever of doubtful origin is described. Sixty cases were observed in German soldiers in the Dniester River region of Bessarabia during a spell of hot and dusty weather. No cases were seen in the cool and rainy days of the same [unspecified] month.

In all the cases there were two spells of fever separated by a fever free interval during which the symptoms did not completely disappear. In most of the cases both spells of fever were short apparently they lasted one day or less—the second spell was less severe than the first. The onset of each spell was sudden with intense frontal headache and shivering or rigor. There were severe pains in the loins and in two thirds of the cases there was tenderness over the rectus abdominis muscles. There were redness and swelling of the mucosa of the throat but no symptoms referable to the tonsils thoracic or abdominal viscera.

The fever free interval lasted four or five rarely six days and the total duration of the attack was five to seven days.

In a few cases the initial fever lasted three days and ended by lysis but after two days of freedom from fever the terminal rise occurred as in the other cases.

Infrequently there were rheumatoid pains in the knee ankle or wrist joints for two days after defervescence. In another group of 19 patients who had suffered from similar attacks but were not seen till after the end of the fever there were severe pains in the muscles of the back chest or neck beginning 10 to 14 days after defervescence and lasting five to six days. There was no rash. The leucocyte count did not exceed 6 000 to 8 000 even during the febrile periods.

The disease differed from sandfly fever in the occurrence of a secondary rise of temperature and in the absence of bradycardia anorexia and conjunctivitis. It differed from dengue in the absence of rash and relative lymphocytosis. It differed from both of these diseases in the rapid establishment of complete convalescence. No definite statement

could be made about transmission by sandflies but all the patients denied having been troubled by insect bites.

Although sandfly fever and dengue could not be excluded with certainty it was considered more likely that the disease was of a special type and was caused by a virus inhaled with dust.

If mosquito or sandfly transmission could not be excluded the most likely diagnosis would seem to be a fever of the dengue-sandfly fever group. There are records of outbreaks of undoubted dengue in which the rash has been detected in less than 10 per cent of the cases and this disease is notoriously variable in its clinical features. The present outbreak shows all the characteristics that are invariably seen in dengue so it may have been a new variant of that fever rather than a new disease. In sandfly fever secondary rises of temperature are by no means rare though their occurrence in all the cases would be distinctly surprising. The suggestion by von BORMANN (above) that the disease may well have been trench fever strikes the reviewer as being far fetched.¹

John W. D. Maca

YELLOW FEVER

PENNA H S & BITTENCOURT A. Persistence of Yellow Fever Virus in the Brains of Monkeys immunized by Cerebral Inoculation. *Science* 1943 May 14 448-9

Persistence of virus in the body of the host after infection despite a refractory state to reinfection from without has been shown to occur in the case of a number of viruses and it has been suggested that lasting specific immunity following some virus diseases depends on this persistence. Polio is, salivary gland virus infection of guinea-pigs, encephalomyelitis and herpes are cases in point.

Yellow fever vaccine is prepared from the active attenuated strain 17D and a *hes* monkey is inoculated intracerebrally as a test of each batch. The animal usually reacts with fever of short duration followed by recovery with the appearance of specific neutralizing antibodies in the blood but sometimes they show symptoms of involvement of the central nervous system.

Some of the animals used for these tests died apparently of generalized tuberculosis and attempts were made to isolate the virus from their brains by injection of brain material intracerebrally into mice. Strains identified immunologically as yellow fever virus were identified from three monkeys which died 63, 93 and 159 days after inoculation. There was some indication that the amount of virus varied according to the length of time since inoculation: at 63 days all the mice injected were dead by the ninth day; at 93 all were dead by the thirteenth day; at 159 days only three of 12 mice developed encephalitis.

Five other monkeys were killed 100 days after inoculation but no yellow fever virus was recovered. Two others were given intracerebral trench injections 161 and 170 days after inoculation in an attempt to localize possibly existing virus: the results were negative.

It is suggested that the tuberculous infection may have had some effect in maintaining a latent virus in the three positive monkeys.

C B

PLAGUE

STEWART M A Present Knowledge of the Status of Vectors of Sylvatic Plague in North America *Proc 6th Pacif Sci Congr 1939* v 4 433-7 [Summary taken from *Rev Applied Entom Ser B 1943 July* v 31 Pt 7 132]

The following is based on the author's summary. The presence of sylvatic plague has been demonstrated in California Oregon Washington Idaho Nevada Utah and New Mexico in North America and 21 species of rodents have been found with anatomical lesions or bearing infected fleas. As the most widely distributed fleas among these rodents are *Ceratophyllus (Diamanus) montanus* Baker *C (Oropsylla) idahoensis* Baker and a subspecies of *C (Orchopeas) sexdentatus* Baker it is considered that their efficiency in transmission should be studied first. Investigation is also required on the part played by *Echidnophaga gallinacea* Westw and *C (Malariaeus) telchimum* Roths in spreading the disease between domestic and wild rodents as they occur on both. The latter is the more active and therefore probably the more important. The incidence of lesions in susceptible wild rodents is usually high in autumn and their flea indices increase markedly at this time. The flea population of wild rodents is apparently more or less constant for each season and a host freed of its fleas will very quickly acquire a normal infestation. Rodent poisoning does not increase the flea index on surviving animals and consequently does not increase the rate of infection. Wild rodents apparently acquire infection by ingesting infected fleas or rubbing infected fleas and rarely faeces into skin wounds by the bites of fleas with contaminated mouth parts by the bites of infective blocked fleas and by eating one another. The part played by fleas in the transmission of plague from wild rodents to man is not understood. A number of cases of human infection have been traced to bites by captive wild rodents.

EWING H C & FOX I The Fleas of North America Classification Identification and Geographic Distribution of these Injurious and Disease-Spreading Insects *U S Dept of Agric Misc Publ No 500 1943 Feb* 143 pp 13 figs [91 refs]

The fleas of the United States have been carefully studied partly at least because of the existence of sylvatic plague and murine typhus. But they have not been monographed since BAKER (1904) though the second author of the present paper revised the species known from the eastern United States in 1940.

The present paper deals with some 60 genera and 209 species.

The authors give a considerable amount of information which would be valuable to workers in other continents. There is a detailed account of the structure of head thorax and terminal abdominal segments and a full description of the anatomical characters of the Order Siphonaptera. The authors recognize six families (all occur in N America) taking in this respect a rather conservative view. The key to families and subfamilies and descriptions of these units will be generally useful. Genera are also diagnosed but (rather unfortunately) species are not described nor are keys provided. It is therefore generally impossible to identify species from this monograph. Species are however listed with data on synonymy type host and locality and range.

It is a matter of some interest to know that for many years *Xenopsylla cheopis* appeared to be confined to large ports. Since 1925 however it has been found in a number of inland areas including States so far north as Iowa and Minnesota. It is now recorded from 19 States (15 of them inland) and the District of Columbia.

P. A. Bixton

GIRARD C. Le comportement de la puce *Synopsyllus foetorius* et son rôle dans la transmission de la peste [The Flea *Synopsyllus foetorius* and its Role in Plague] *Bull. Soc. Path. Exot.* 1942 Apr. 22 May 13 v. 35 Nos. 4-5 177-81

WAGNER and ROUBARD gave a description of the new flea *Synopsyllus foetorius* in 1932 (*Bull. Soc. Path. Exot.* 25: 327) from four examples only which had been found among a lot of 8,000 taken at Antananarivo from *Rattus rattus alexandrinus*. It was found again soon after in abundance as the sole flea on insectivorous hedgehog and once that time has multiplied considerably in Emyrne on the high plateau of Madagascar. The flea unlike *X. cheopis* flourished in the cold weather (May to October) on rats outside habitations and in their burrows. An index of this flea per rat can scarcely be set out; its numbers are too small. Its number had therefore best be expressed as a percentage of *X. cheopis* with which it is always associated. *Synopsyllus foetorius* has been shown capable experimentally of infection by plague bacilli and of transmitting plague to guinea pigs. Whether this flea bites man is liable to be blocked like known vector fleas and what are the meteorological factors influencing its vitality and infectivity still remain to be worked out.

W. F. Harvey

SHERARD G. C. A Plan for Rodent Control in Cities. *Pub. Health Rep.* Wash. 1943 May 28 v. 58 No. 22 8-37 (14 refs.)

It would probably be admitted that rodent control is desirable in all cities but it may not be so fully realized that a rat campaign based upon a misconception of the factors involved may be termed a futile public health effort. A well considered plan with provision for permanent control measures is necessary. The author's description in some detail of such a plan will repay consultation. The headings of the scheme are as follows: (1) Trained leadership (2) Office space and equipment (3) Field equipment (4) Records (5) Survey of actual and potential harborages (6) Trapping (7) Identification and classification of rodents and their ectoparasites (8) Rat proofing ordinance (9) Cooperation with other city departments and agencies (10) Education and publicity (11) Enforcement of provisions of ratproofing ordinance (12) Permanent control measures. In the matter of training The United States Public Health Service may be consulted. It is prepared to assist in planning a course of instruction which should demand at least 90 days training. One of the most essential recommendations in this plan is that the control procedures should be permanent. They are in order of importance: (a) Rat proofing of all new buildings (b) Rat proofing of infested buildings and fixtures with due attention to business investment interests (c) Elimination of accumulations of waste material (d) Neat and orderly storage of all goods and supplies to allow of complete visibility of rat

nesting places (e) Trapping (f) Fumigation followed by proper sanitary measures (g) Poisoning A good list of useful reference works is appended
W I Harvey

CHOLERA

WILKINSON P B Cholera in Hong Kong *Lancet* 1943 Aug 7
169-70

Cholera had been absent for some years in Hong Kong when it broke out severely in 1937 The number of cases in 1938 1939 and 1940 was 547 708 and 647 with 363 448 and 331 deaths respectively Treatment was as follows Axillary and rectal temperatures and blood pressures were taken intravenous injections of normal saline bicarbonate saline (gr 160 per pint) or 2 per cent glucose saline were begun at once Hypertonic salt solution was not given as it had not proved demonstrably efficacious and might be the cause of acute toxæmia with indrawing of fluid from the intestine The temperature of the injection fluid was regulated by the difference between skin and rectal temperature—the greater the difference the lower the temperature of the saline Rate of flow was governed by the degree of dehydration present Two great dangers to life in cholera must be foreseen to be combated hyperpyrexia during the reaction stage and anuria Treatment of anuria consisted in the six hourly infusion of 1 000-1 200 c cm of bicarbonate saline the giving of hot rectal salines and cupping of the loins Hyperpyrexia should be watched for during the infusion of saline and if threatened met by the application of ice packs or rectal injection of iced saline If the rectal temperature which should be taken every half hour transgresses 106 F death will ensue Suppression of urine occurs when the systolic blood pressure drops below 70 mm Hg

As measures of control five points may be stressed (1) Boil all drinking water (2) Eat no uncooked food (3) Be inoculated (4) Avoid purgatives (5) Diminish the fly nuisance W I Harvey

SADLER J F Jr & OSWALD Elizabeth Comparative *in vitro* Effect of the Various Sulfonamides on *V. cholerae* *Amer J Trop Med* 1943 Mar 23 No 2 275-9 1 fig [11 refs]

In vitro experiments with antibacterial reagents have usually been carried out so as to differentiate between bacteriostatic and bactericidal effect Attention must also be paid however to the fact that component substances in the nutrient medium itself may inhibit the action of the test reagent Such inhibiting substances in the media used may have vitiated some of the work already done on sulphonamides In the present investigation care has been taken to use a synthetic medium which is free from this defect It is an asparagin ammonium sulphate glucose medium and the test sulphonamide was dissolved in it to yield a series of concentrations ranging from 0.1 up to 200 mgm per 100 cc Two measures of activity were determined (1) the *bacteriostatic concentration* the lowest concentration which inhibited growth and (2) the *bactericidal concentration* or the concentration which did not permit growth on reincubation of tubes after the

action of the sulphonamide had been abolished by the addition to each tube of 0.1 cc. of a 100 mgm per 100 cc. solution of para amino benzoic acid. The result of this test^o showed the great superiority in the case of *V. cholerae* of sulphathiazole bacteriostatic at 0.1 mgm per 100 cc. over sulphadiazine, sulphaguanidine and sulphanilamide in that order. It is unfortunate that sulphathiazole may be too readily absorbed from the intestine to be effective therapeutically, sulphaguanidine may be preferable as concentrations of over 200 mgm per 100 cc. in the stool may be readily attained with it.

H. T. Harvey

BACILLARY DYSENTERY

SAVAGE T. R. The Treatment of Acute Bacillary Dysentery with Sulphapyridine. A Possible Emergency Substitute for Sulfaguanidine. *J. Roy. Army Med. Corps* 1943 May v 80 No 5 215-8

The author reports favourably on sulphapyridine in the treatment of bacillary dysentery and advocates its use if the drug of choice, sulphaguanidine, is not available. He records 13 cases in 11 of which the organism was identified. The doses advised are 2 gm. initially followed by 1 gm. every four hours, a total of 15 gm. was enough for all patients except one who had a mixed infection with Shiga and Flexner organisms. The number of stools was reduced to three a day usually within 48 or 72 hours and fever, tenderness and colic disappeared even more quickly. Morphine was useful in the early stages but intravenous salines were not needed.

Sulphapyridine produced the usual depression and nausea occurred in some cases. One patient developed an erythematous rash. The drug was most successful in Flexner infections but the author considers that it should be used for the Shiga type if sulphaguanidine is not at hand.

C. H.

SWYER R. Sonne Dysentery. Sulphapyridine in its Treatment. *Lancet* 1943 July 17 71-2

Any procedure which curtails the illness caused by Sonne dysentery and reduces the number of carriers is important. The present series comprised 92 cases of Sonne dysentery, 57 of which were treated with sulphapyridine and 3 were used as controls.

As far as possible daily bacteriological examinations of faeces and rectal swabs on desoxycholate-citrate agar were carried out in the sulphapyridine series and twice weekly in the control.

Treatment with sulphapyridine by mouth was instituted immediately on isolation of *Bact. dysenteriae* Sonne and was continued until negative faecal and rectal swab cultures were obtained. Forty-eight hours after cessation of treatment further bacteriological examinations were carried out when negative these were repeated until a minimum of three consecutive negative faeces and rectal swabs had been obtained. If positive the routine course of treatment was repeated. There was little toxæmia or dehydration in either group. Blood was passed in the faeces for an average of three days by 29 of

the patients but nearly all passed mucus. In the sulphapyridine series the stools rapidly became normal in appearance while in the controls improvement began much later. Bacteriological relapses occurred in three of the cases that were treated with sulphapyridine but only within the first 2-3 days after stopping the treatment while in the controls changes from negative to positive took place in six instances at later periods (7-36 days) thus some patients became convalescent carriers. Numerous total and differential white cell counts were made but no blood changes of any real significance were encountered.

Particularly significant has been the great reduction in time required for both clinical and bacteriological cures—particularly in the lower age groups—and the complete absence of convalescent carriers in the chemotherapy series.

P Manson Bahr

COMPTON A Comparative Value of Phage and Sulphonamides in Acute Bacillary Dysentery [Correspondence] *Brit Med J* 1943 Aug 7 178-9

The author compares the published results obtained in the treatment of bacillary dysentery by FAIRLEY and BOYD [*Brit Med J* 1942 Dec 5 673] with sulphaguanidine by REITLER and MARBERG [this *Bulletin* 1941 v 38 280] with sulphapyridine and by himself [this *Bulletin* 1930 v 27 396] with antidysentery bacteriophage. He says that attacks of bacillary dysentery have become matters of little concern in Alexandria owing to the efficacy of phage treatment and few practitioners with any genuine experience of good phage preparations will I think want to change their accustomed line of treatment with phage for sulphonamides unless it be in the occasional chronic case that may not respond straightway to phage. He urges the use of bacteriophage in the Services since unlimited supplies could be made available. [See also this *Bulletin* 1942 v 39 36]

J F Corson

YAWS AND SYPHILIS

BRICENO ROSSI A I El valor del Verifications Test en la serologia del carate o mal del pinto y buba (pian o yaw) [The Verifications Test in Pinta and Yaws] *Rev Sanidad y Asistencia Social* Caracas 1943 Feb v 8 No 1 153-65 [10 refs]

The Verifications Test is designed to exclude or differentiate non specific reactions in the Kahn test for syphilis and is therefore of particular value when the clinical and serological findings are at variance. The test consists in noting the effect of temperature on the Kahn standard test the temperatures chosen being 37 and 1 C. True syphilitic sera flocculate at the higher temperature but not at the lower with non syphilitic sera the reverse obtains. In other words morbid conditions giving false positives would be reported as Negative at 37 C positive at 1 C.

In the present study the author carried out the test on 311 human and 10 animal sera. The former included healthy persons 61 sera from venereal dispensaries 155 cases of pinta 37 of yaws 18 of leprosy

30 and 10 from the tuberculosis dispensary. The animals included dogs, rabbits, horses, sheep and guinea-pigs. One or two of the results may be given: of the 30 leper sera 19 were negative to the Kahn standard at both temperatures, four were positive to both, three of those Kahn positive were so at 37° but negative at 1°C, and four others the reverse of this. Thirteen syphilitic sera were positive to the standard Kahn at 37°, negative or weakly positive at 1°C. Of the 37 pinta sera 23 positive to the standard Kahn were so at 37° but negative or weakly positive at 1°C, one with 4 plus standard gave 2 plus at 37° and 1 plus at 1°C, three were positive at both temperatures. Fourteen yaws sera were positive at 37°, negative or weakly positive at the lower temperature.

In brief, of the total 371 sera 303 gave the same result in the standard as in the two temperature tests, the 18 which did not were either animal sera or sera from cases of leprosy or malaria. That is to say that sera of syphilis, pinta and of yaws patients proved specific by the Verifications Test. The results are presented in a series of tables. [The test does not therefore help in any way to distinguish serologically between these three spirochaetal diseases.]

H. Harold Scott

MONTEL R. La syphilite exotique chez les Annamites de Cochinchine. The So-called Exotic Syphilis in Annamites of Cochinchina. *Bull Soc Path Exot* 1942 Apr 27 & May 13, 35 Nos. 4-5 137-47. [S2 ref.]

This is a critical review of the literature on the old question of the resistance to the invasion of *Sp. pallida* of the parenchyma of the central nervous system in other than white races, and of the existence of neuro-tropic and dermato-tropic strains of the organism.

The author reviews the old arguments that the natives of Indo-China like those of North Africa suffer severely in their skin and skeletal structures but not in respect of tabes and general paresis because of some special strain of *Sp. pallida*. He points out that the severe effects of syphilis on the skin etc. of natives of Cochinchina are only the result of additional trauma to which these structures are exposed there to malnutrition to indifferent hygiene to neglect of treatment and so forth, such conditions largely prevailed in Europe in past centuries and the external manifestations of syphilis were correspondingly violent.

He shows by quotation from articles by many writers that the natives of Cochinchina do suffer from tabes and general paresis, and the apparent absence or scarcity of these effects of syphilis in the past was due only to lack of skilled observation. Tabetics were overlooked until the ophthalmologists and the neurologists began to examine the native sick in closer detail and the general paretics were usually hidden by their relatives.

Against the view often advanced that the greater frequency with which parenchymatous neuro-syphilis is seen to-day in these parts is due to the introduction of arsenical treatment, the author points out that a large proportion of these patients had not received any treatment whatever.

He cites similar observations in China and North Africa and concludes that there is only one syphilis and its effects are largely conditioned by the circumstances rather than the make up of its victims.

He regards race and climate as negligible factors if they exist as factors at all. He seems to leave open the question whether neurosyphilis is proportionally to the infected as prevalent in Cochin China as in Europe—that will be decided by further observation.

L. W. Harrison

LEPROSY

FAGET G. H. Control of Tuberculosis in a Leprosarium. *Immer Rev. Tuberculosis* 1943 June v 47 No 6 603-7

This paper deals with the difficult subject of the frequent tuberculosis complications among leprosy patients at Carville U.S.A. Data are quoted to show the proportion of deaths due to complicating pulmonary tuberculosis among lepers in various countries—they found from 24 to 32 per cent of deaths at the Culion Leper Colony and 18 per cent at the U.S.A. leprosarium in Louisiana. In controlling this loss the most important step is the early diagnosis of the lung complication by means of X-rays and the isolation of these patients to prevent their spreading the infection to others. Finding acid fast bacilli in the sputum is not diagnostic as they may come from throat or air tube infections with lepra bacilli so inoculation into animals or cultivation of the tubercle bacillus is also necessary. Leprotic lesions of the lung tissue are very rare and are too small to be seen by X-rays. At Carville radiographs are taken of the lungs of all patients on admission and the fact that in that well financed institution each patient has a separate room further diminishes the chances of the occurrence of tuberculosis infections. When that complicating disease is found all active anti-leprosy treatment is stopped and artificial pneumothorax and other remedial measures used with as good results as in uncomplicated phthisis. Among 32 patients studied for 1 to 2½ years at Carville 10 with advanced disease had died and two others are doing fairly well in several with slightly or moderately advanced disease the lesions have become quiescent. The prognosis therefore as far as tuberculosis is concerned is fairly good.

L. Rogers

HELMINTHIASIS

CHIN T. H. & LI K. C. A Survey of the Metazoan Parasites of the Domestic Cat *Felis domestica* of Kweiyang. *Chinese Med. J.* 1942 Oct v 61A No 1 (Chengtu Edition v 1 No 1) 30-36*

1 A survey of 120 domestic cats *Felis domestica* for metazoan parasites was conducted in Kweiyang. Only one of the animals was found free from parasites.

2 Sixty per cent of the cats were found infested with one or more species of ectoparasites—four species of fleas *Ctenocephalides felis felis*.

This is the first issue of the *Chinese Medical Journal* to be published in Chengtu. The editors are to be congratulated and readers throughout the civilized world will be glad to know that this fine journal continues despite the war.—Ed

Xenopsylla cheopis *Monopsyllus anisus* and *Pulex irritans* and one species of louse *Trichodectes* sp

3 More than ninety per cent (97.5) of the animals were infected with helminths and 59.83 per cent were infected with trematodes i.e. *Pharyostomum cordat*, *Paraonimus Fasciola hepatica* and *Eurytrema* sp. with a negative finding for *Clonorchis sinensis*

4 Some four species of cestodes were recovered from 87.50 per cent of our cats they were *Diphyllbothrium spargana* *Taenia taeniformis* and *Dipylidium caninum*

5 Nine species of nematodes namely *Toxocara mystex* *Ancylostoma brasiliense* *A. caninum* *Uncinaria* sp. *Thelazia callipaeda* *Chlorodonema praeputial* *Cylicospira* sp. *Dirofilaria immitis* and *Capillaria* sp. were found in 85 per cent of the animals examined

6 The following parasites are reported for the first time in the cat in this country *Xenopsylla cheopis* *Monopsyllus anisus* *Trichodectes* sp. *Fasciola hepatica* *Eurytrema* sp. and *Uncinaria* sp. *Eurytrema* is probably also reported for the first time from the cat

[See also this Bulletin 1942 v. 39 627]

POIRIER M. & BLONDEL P. Sur deux tumeurs observées chez des Sénégalais l'une vésicale due à *Schistosoma haematobium* et l'autre iliaque due à *Onchocerca olivulus* [On Two Tumours observed in Senegalese one Vesical due to *Schistosoma haematobium* and the other Iliac due to *Onchocerca olivulus*] *Bull. Soc. Path. Exot.* 1942 Apr 27 & May 13 v. 35 Nos 4-5 161-2 4 figs on 2 pls

The first patient entered hospital with haematuria at the end of micturition. Numerous erythrocytes and epithelial cells were found in the urine but no eggs of *Schistosoma*. Cystoscopy revealed multiple haemorrhagic tumours at the level of the apex of the bladder and on its anterior wall. Subsequent operation showed that some were sessile and some stalked. All were friable and about the size of peas. The blood count showed 9 per cent of eosinophil. In sections of the tissue removed there were very numerous eggs of *Schistosoma haematobium*, a marked local eosinophilia, sclerosis and thrombophlebitis.

The second patient had a painless swelling about the size of a pigeon's egg on the left hip, one cm. below the iliac crest. It was circumscribed, mobile, not adherent to the skin and firm. There were 6 per cent of eosinophils in the blood. A tumour the size of a nut was removed. It had multiple cavities containing parts of male and female nematodes. The uterus of the females contained numerous embryos and many microfilariae were free in the connective tissue. These were identified as those of *Onchocerca olivulus*. G. Lapage

MARTÍN SÁNCHEZ A. Sobre un caso autóctono de bilharziosis vesical observado en la isla de La Palma (Canarias) [On an Indigenous Case of Vesical Bilharziasis observed in Las Palmas (Canary Islands)] *Rev. Clin. Española* 1943 Feb 15 v. 8 No. 3 196-9

The author describes what he regards as the first case of vesical bilharziasis to be recorded in the Canary Islands.

The patient was a native of Tegueste, Tenerife, aged 23. He had always lived in Tenerife until he came to the island of Las Palmas a few months before he was seen. He had been healthy until 15 days

before he was examined he had dysuria and ultimately haematuria. General examination failed to reveal anything of interest. The erythrocyte count and haemoglobin were normal but there were 9.5 per cent of eosinophils. Cystoscopy showed that all the vesical mucosa was hyperaemic and in some areas there were groups of eggs of *Schistosoma haematobium*. These eggs were found in the urinary sediment. The patient was treated with intravenous cytotropin and intramuscular foudin. After the fourth injection of foudin a few small worms (unos pequenos gusanos) were expelled by the urethra. A month after commencement of the treatment blood and eggs of *Schistosoma* had disappeared from the urine and the patient was considered cured. He fought in the Spanish war and has remained well since.

The rest of the paper discusses bilharziasis and the cases previously recorded in Spain and Portugal. The high incidence of helminthiasis and protozoal infestations in the Canary Islands is discussed. The author considers that 80 per cent of the children of the poorer classes and the rural population are infested with helminths (*Astasis*, *Trichuris*, *Enterobius* and other species).

G Lapage

LUTTERMOSER G W. Destrucción de caracoles transmisores de *Schistosoma mansoni* en Venezuela [Destruction of Snails transmitting *Schistosoma mansoni* in Venezuela]. *Rev Sanidad y Asistencia Social* Caracas 1943 Feb v 8 No 1 3-44 4 figs [30 refs]

This is Part II of a report on the author's work. Part I of which was published in the *Rev Sanidad y Asistencia Social* v 6 No 6 874-897 [not received at this Bureau]. The author here records his work on the biology of the snail *Australorbis glabratus* (*Planorbis guadeloupensis*) [cf BRUMPT this Bulletin 1942 v 39 866 who concludes that the correct name of this snail is *Planorbis* (*Australorbis*) *glabratus*] the vector of *S. mansoni* in Venezuela and also his successful control of the snails by means of recently slaked lime applied to the waterways.

Methods of cultivating the snails in the laboratory are described. The snails began to lay eggs when they were 3-6 months old the number laid by each snail varying from 6 to 391 per month. The snails live for 1-14 years. Some were still alive after 2 months in the laboratory in a box of dry earth. Drying of the canals is of doubtful value in Venezuela because some water always remains in them. Reconstruction of the waterways could remedy this but it is probable that many canals will be removed in the future and it is useless to improve the canals when the rivers are also infested by snails. Control of the vegetation of the river banks would render the breeding of the snails more difficult but treatment of the water is more sensible and more effective. Laboratory experiments are described which indicate that the snails are killed by a 0.1 per cent solution of recently slaked lime within a day or less and their eggs are also killed in this solution although they can develop in concentrations less than this. The cercariae of *S. mansoni* are killed in 15-60 minutes by a 0.05 per cent solution of lime in a 0.025 per cent solution they are all dead in 3-5 hours. Solutions of the various components of the lime solution were also tried. The results indicated that calcium chloride, calcium sulphate, sodium chloride and sodium bicarbonate did not kill the snails. The author supposes that the hydroxides of calcium, sodium

and magnesium were the lethal agents. Section of nail killed in the lime indicated that the cause of death was damage to epithelia of the snails and consequent haemorrhage but lack of published work on the histology of this nail made it difficult to determine the exact cause of death.

Treatment of waterway with lime was tried in 1 kilometre of a canal in the suburb of El Cementerio Caracas in a section of a canal near Antumano in a cement tank and in 500 metres of the river El Valle. The methods of distributing the lime (by hand or by emptying sacks into the canal or spreading it over the banks or both) and the traps used to prevent snail from entering treated waters are described. Several lime treatments kept the waters used for experiment practically free of snails for six months. Usually one lime treatment every three months was enough and it killed also the egg of the snail and the cercariae. It also reduced considerably the bacterial content of the waters. The cost is given. It is not considered high especially when the danger of schistosomiasis is considered. It depends on the number of snail, the physical nature of the site and the possibility of preventing the entry of snails into the water treated. Lime is cheap and easily obtained. It is bactericidal and neutralizes the acid soil prevalent in the endemic area. The method of using it is simple and effective. The author recommends that tanks and canals should be dried completely for three consecutive months. This can be done only in the dry season. Canals should be improved so that water does not persist in them when they should be dry. Vegetation should be removed and other measures taken to prevent the breeding of snails. Destruction of the snails is however only a part of the general problem for the solution of which co-operation of the public, the Government, the sanitary workers and the teachers is required.

G. L. Pa

NEUMANN M. A. Cysticercus Cellulosae of the Brain. Report of a Case. *J. N. of th. G. Exf.* Vol. 1, 1943. Apr. 4 figs. (11 ref.)

WOLFE H. R. I. Hydatid Disease in Wales. *Lancet* 1943. June 26. 795-9. 6 figs.

The author quotes figures taken from the Registrar General's returns in support of his opinion that hydatid disease is commoner in Wales than elsewhere in Great Britain. Deaths attributed to this disease per head of the population were 1/72,000 in Wales, 1/372,000 in England and 1/2483,000 in Scotland. A comparison of the numbers of cases treated for hydatid disease in five hospitals in South Wales and in three London hospitals indicates the same conclusion.

In 34 cases treated at the Cardiff Royal Infirmary between 1926 and 1938 the age of the patients at the time of admission to hospital was between 24 and 68 years. The age of the patient was no criterion of the age of the infestation, the latter being usually long standing. The age of the infestation is indicated by the presence or absence of multivesiculation, sterility, calcification or complications of the cysts. Infestation is probably acquired in childhood or in early adult life chiefly from dogs by handling their infected muzzles or by their contamination of gardens, etc. Direct contamination is probably the commoner method of infestation. Inefficient supervision of slaughter houses in some districts help to spread infestation in dogs.

Infested persons may lead a comparatively normal life for years and the degree of incapacity caused is slight. Primary cysts in the lung and liver attain a large size before they cause symptoms. Brain cysts are rare. The symptoms and various methods of treatment are discussed. Injection of a 1-2 per cent aqueous solution of formalin should be a routine procedure. Just over half the author's 34 cases were diagnosed before operation. Sixteen patients died so that mortality was high especially in patients over 40. Operations were done on 27 of the cases and these are described. *G Lapage*

IRSH J E Jr Serological Studies on the Mouse Strain of the Dwarf Tapeworm *Hymenolepis nana* var *fraterna* *Amer J Hyg* 1943 May v 37 No 3 289-93

White mice infected with the dwarf tapeworm *Hymenolepis nana* var *fraterna* were shown to have elaborated specific agglutinating precipitating and complement fixing antibodies. The latter were also demonstrated in two rabbits that had received repeated injections of the worm antigen. In addition a report is given of tests performed which indicate the absence in this cestode of Forssman's heterogenetic antigen.

MAZZOTTI L & OSORIO M Teresa Cinco nuevos casos de infección humana por *Hymenolepis diminuta* en México [Five New Cases of *H. diminuta* Infection in Mexico] *Rev Inst Salubridad y Enfermedades Trop* Mexico 1943 Mar v 4 No 1 49-52 English summary (2 lines)

CHANG K TONG W K LI C H & CHIN H T The Epidemiology and Importance of Hookworm Disease in Szechwan Province *Chinese Med J* 1942 Oct v 61A No 1 (Chengtu Edition v 1 No 1) 1-8

1 On account of extraordinarily favorable climatic conditions and certain agricultural practices hookworm infection and disease have been found to be very widespread in Szechwan which is one of the largest richest and most densely populated provinces of China.

2 Severe hookworm disease which constitutes an important public health problem has been found over a large section in North Szechwan and in certain areas in East and South Szechwan.

3 In striking contrast to the situation in the sericulture centers in east China investigated by Cort *et al* of the China Hookworm Commission no association between mulberry cultivation and hookworm disease in the mulberry areas of this part of China has been found.

4 In full agreement with the conclusion reached by the China Hookworm Commission our epidemiological studies have proved that cultivation of rice in Szechwan produces conditions unfavourable for hookworm transmission.

5 Epidemiological studies have indicated that cultivation of sugar cane and citrus trees in the province do not seem to be important sources of hookworm disease.

6 General dry land cultivation of miscellaneous crops in the hilly sections of the province probably produces conditions rather favorable for hookworm propagation.

7 A specific association of corn sweet potato cultivation and hookworm disease previously unknown in China or elsewhere has

been discovered in Szechwan. The procedure of corn sweet potato intercropping produces remarkably ideal conditions for the dissemination of hookworm.

COURTNEY A. D. Unusual Case of Obstruction by Worms. [Memoranda] *Brit Med J* 1943 June 12 725-6

The patient was a child aged five in County Tipperary who had an attack of abdominal pain and vomiting without rise of temperature and without abdominal rigidity. Restlessness was the most pronounced feature. Under anaesthesia a mass suggesting intussusception could be felt below and to the right of the umbilicus and on opening the abdomen this was found to be obstructed intestine. On incision of the bowel wall several roundworms, presumably *Ascaris lumbricoides*, presented and 66 were removed. The obstruction was thus relieved. Recovery was good and a week later a course of five 2 grain santonin powders at two-day intervals was commenced. This treatment brought away 13 more worms. [See this *Bulletin* 1924 \ 21 957 1928 \ 25 961 1929 \ 5 550 1934 \ 31 793 1936 \ 33 108 1938 \ 35 670 1939 \ 36 371 723 1940 \ 37 299 480] C H

STEFANOPOULO G. Prurigo filarien ou gale filarienne dans un cas de filariose à *Loa* (Filarial prurigo or Gale filarienne in a Case of Filariasis due to *Loa loa*). *Brit Soc Path Exot* 1942 Apr 22 & May 13 \ 35 Nos 4-5 157-61 2 fig

Gale filarienne is not always due to infestation with *Onchocerca rostratus*. The author describes two cases due to infestation with *Loa loa*. The first was in a boy of 19 who began to show the characteristic Calabar swellings after his return from Sierra Leone but the main symptom was very marked pruritus with prurigo. There was enlargement of the glands especially of those in the left groin. Biopsy of these glands did not reveal any microfilariae. There was an eosinophilia of 20-44 per cent. No microfilariae were found in the blood but the complement fixation reaction for filariasis was positive. No trace of onchocerciasis was found.

The second patient a woman aged 32 acquired *L. loa* infection in Gabon in 1934-7. She had typical oedema and itching at night. The eosinophilia was 60 per cent. No microfilariae were found in the blood but complement fixation and intradermal reactions were positive. Antimony treatment resulted in some improvement of the pruritus. The author emphasizes the help obtained from the complement fixation and intradermal reactions especially in the diagnosis of *L. loa* infection which can show such various clinical aspects. He does not state what antigen was used.

G Lapeere

WELLER T. H. The Development of the Larvae of *Trichostrongylus axei* in Roller Tube Tissue Cultures. *Amer J Path* 1943 May \ 19 No 3 503-15 8 fig on 2 pls & 1 text fig [14 ref.]

After discussing earlier attempts to cultivate larvae of *Trichostrongylus axei* and other nematodes in sterile media the author describes his roller tube tissue cultures which consist of chick embryo fragments planted in chick plasma clot distributed evenly over the walls of test tubes to which a nutrient medium was added. Into these 50-300

larvae of *Trichinella* per tube were placed and their development was observed with a microscope some larvae being removed for examination whenever the nutrient medium was being renewed i.e. daily. The larvae obtained by peptic digestion from infected rats were sterilized by repeated washing in normal saline this method being adopted because it was found that the antiseptics tried (quinamil merthiolate and hypochlorites) were toxic to the larvae.

Partial development of the larvae occurred in the cultures and a small percentage moulted twice. Some attained a degree of sexual differentiation (anal papillae in the male and formation of the vulva, ovary and uterus in the female) but the larvae decreased rather than increased in size, died off progressively and often were unable to cast their skins so that larvae still enclosed in 1-3 uncast sheaths were seen. The first moult was completed by 10-20 per cent of all larvae the second moult was seen only twice the incomplete sexual differentiation seen occurred only in larvae which lay inside one or more uncast skins. The occurrence of larvae inside three uncast skins suggests that earlier workers are right in stating that there are normally four moults but one or more of the incomplete ecdyses seen may have been responses to the abnormal environment.

The addition of sterile sand to the medium in an attempt to favour ecdyses and of yeast or liver extracts vitamins and other substances failed to improve the medium. The growth of the chick embryonic tissue was not affected by the presence of the larvae. G. Lapaque

REIMANN H. A. PRICE ALISON H. & HERBUT P. A. Trichinosis and Periarthritis Nodosa. Differential Diagnosis. Possible Relationship. *J. Amer. Med. Ass.* 1943 May 29 v. 122 No 5 274-9 7 figs [Refs. in footnotes]

The 2 cases presented were regarded clinically as trichinosis yet the typical lesions of periarthritis nodosa were present in tissue examined during life. Both patients had chronic nephritis. One died and at necropsy no evidence of periarthritis nodosa remained but trichinellae were found in the muscles. There is a possibility that trichinosis as a disease with strong allergic manifestations may in certain instances serve as one cause of the syndrome called periarthritis nodosa.

NAGEL A. Ueber spezifische und unspezifische serologische Befunde bei der Trichinose des Menschen. [On certain Specific and Non Specific Serological Results in Trichiniasis of Man.] *Ztschr. f. Immunitätsf. u. Experim. Therap.* 1943 Feb 12 v. 102 No 6 424-32.

This paper is reviewed in *Bulletin of Hygiene* 1943 v. 18 p. 640.

MARTINIC A. Estudio sobre triquinosis en Santiago con especial referencia a su importancia clínica y epidemiológica y a la intradermo reacción diagnóstica de Bachman. [Trichiniasis in Santiago (Chile). Its Clinical and Epidemiological Importance. Bachman's Reaction in Diagnosis.] *Rev. Chilena de Hig. y Med. Preventiva* 1942 Sept v. 5 No 2 131-66 7 figs (6 on 3 pls.) [43 refs.] English summary.

This paper is reviewed in *Bulletin of Hygiene* 1943 v. 18 p. 641.

WRIGHT W H & BOZICEVICH J Experiments in the Cooking of
Cabbage for the Destruction of Trichinæ in Pork Scraps P b
H lth P p Wash 1943 M r s 58 No 10 396-404

This paper re ed n B l l f H y g 1943 18 p 641

DEFICIENCY DISEASES

CEYLON SOCIETY OF MEDICAL OFFICERS OF HEALTH [WICKRE
MESINGHE W G Chairman] Nutrition in Ceylon its Bearing
on National Health and Well being 1942 12 pp 2 charts & 4 figs
Colombo Ceylon Daily News Lake House McCallum Road

The memorandum was prepared by a Committee of the Society of Medical Officers of Health. The poor physique of the Ceylonese is attributed to dietary deficiency rather than to racial factors. Many children show retarded development and vitamin deficiencies. A survey of school children in 1934-36 showed that 7.7 per cent suffered from sore mouth (a sign of riboflavin deficiency) and 9.2 per cent had pityriasis, a skin eruption due to vitamin A deficiency. Keratomalacia causes about two-thirds of the many cases of blindness among infants and young children. The infant mortality rate is nearly three times that of England and Wales. A dietary survey among the rural population showed that 39 per cent of the families surveyed received less than 2,000 calories per adult unit per day, the chief deficiency being in protein and calcium.

The Committee recommends that measures be taken to enable a family requiring four adult-food units per day to receive an adequate income, that more fish and milk should be available, a midday meal be provided for children and a pint of milk daily for nursing mothers and infants where necessary.

J F Co

FERRO-LUZZI G La vitamina A in Eritrea. Nota I. Tecnica di dosaggio e valori in soggetti normali. [Avitaminosis A in Eritrea. I. Technique employed and the Amount in (the Serum of) Normal Subjects.] *Boll d Sc Ital a a d Med e Ig ene Trop* (Soc Eritrea) Asmara. 1941 v 1 No 4 79-84

Both Europeans and natives in Eritrea are often found presenting obvious or latent indications of deficiency of vitamin A. In this article the author describes his method of estimation and the results obtained in persons apparently normal Europeans and natives. He uses a modification of the method of Carr and Price. To 10 cc of serum is added an equal quantity of 95% alcohol. After centrifugation 15 cc of boiling petroleum ether is added to the supernatant fluid. The alcohol is poured off after the mixture has been shaken. The petroleum ether containing the vitamin A is distilled to dryness in a current of CO₂ or nitrogen. The dried residue is taken up with 2 cc of pure chloroform and evaporated in a current of CO₂. This is repeated twice.

and the dried residue now free from petroleum ether is again taken up with 2 cc chloroform and 1 cc of the Carr Price reagent is added and read off against the control. His method avoids saponification of the carotinoid pigment.

The amount in I U per 100 cc has been reported as being within wide limits. Wolff regarded 30-80 as normal. Lindqvist 200-400 and this was confirmed by Rubegni. Dost gave it as 220. Schneider as about 100 units.

The author has studied the figure in 27 Europeans and the same number of natives regarded as healthy. Among the former whose ages ranged between 22 and 75 years the number of units per 100 cc varied from 27 to 84 with an average of 47.7. Among the natives aged 16 to 40 years the amount ranged from a trace to 48 with an average of 22.4 per cent. In other words the subjects tested were in a subclinical state of vitamin A deficiency.

H Harold Scott

FERRO LUZZI G. L'avitaminosi A in Eritrea. Nota 2. Comportamento della vitamina A nel dermatito. [Avitaminosis A in Eritrea. II. Vitamin A in Typhus.] *Boll d Soc Italiana di Med e Igiene Trop* (Sez Eritrea) Asmara 1942 v 1 No 4 85-8

This study was undertaken to estimate the importance of vitamin A in infective diseases by determining first whether the blood content of this vitamin undergoes change in the course of the disease or during convalescence and second if the administration of large doses of the vitamin would modify the content in the blood and affect the clinical course of the disease. The results are presented in a table detailing 19 natives and 12 Europeans the estimations being made at the height of the fever and on the 1st 6th and 10th days of apyrexia. At the height of the fever there was none of the vitamin or at most only a trace present in the blood. On the first day of normal temperature (13th-16th day of the disease) in three cases the amount was 18 I U per cent in 14 an inestimable trace in 10 it was absent. On the sixth day of apyrexia it was present as a trace in six in the others 15-40 units per cent. On the tenth day all but two had regained what the author found to be the normal amount 21-60 I U per cent. Finally he found no benefit from administering the vitamin in the course of the fever.

H Harold Scott

FERRO LUZZI G. L'avitaminosi A in Eritrea. Nota 3. Rapporto tra livello ematico di vitamina A e fenomeni clinici di carenza. [Avitaminosis A in Eritrea. III. Relation between the Blood-Content of Vitamin A and Clinical Signs of Deficiency.] *Boll d Soc Italiana di Med e Igiene Trop* (Sez Eritrea) Asmara 1942 v 1 No 4 89-91

Two hundred native prisoners 16-30 years of age of good general constitution but showing signs of food deficiency were examined in accordance with the technique described above. Thirty four showed a definite deficiency of vitamin A—absence or a mere trace. Thirty two showed follicular keratosis affecting the trunk the anterior surface of the thighs and the elbows as dry white areas ash bark skin or as acuminate papules toad skin. Hemeralopia was found in ten and

of these nine had the cutaneous manifestations also. None of the 34 showed any xerophthalmia. H Harold Scott

TA I G Lavitaminosi A in Eritrea. Nota 4 Studio sull'emeralopia [Avitaminosis A in Eritrea IV Hemeralopia] *Boll d Soc Italiana di Med e Igiene Trop* (Sez Eritrea) Asmara 1942 v 1 No 4 92-4

Medical men in general and eye specialists in particular have remarked on the rarity of cases of hemeralopia in Eritrea. It seems to be endemic in the Dahlac archipelago and among the inmates of the local penitentiary. It is noteworthy, writes the author, that hemeralopia has appeared especially in scorbutic subjects which makes one doubt the general idea that vitamins A and C are antagonistic. (It is difficult to see how this applies to the case in point. Both might be low in such patients.)

The vitamin A content was studied in six hemeralopics from the Nocra penitentiary and in hemeralopics and scorbutics from that of Adi Quala. Not a trace was found in any of them but a diet containing the vitamin A restored the blood-content to normal and the hemeralopia gradually disappeared. H Harold Scott

CHARTERS A D Epidemic of Beriberi amongst Somali Troops in East Africa Command. *Trans Roy Soc Trop Med & Hyg* 1943 July v 37 No 1 55-62 [13 refs]

In February 1941 at a medical inspection of the Somali Frontier Guards nine soldiers were observed to be suffering with anasarca, dyspnoea, tachycardia and patchy anaesthesia. Four of them had enlarged hearts, distended veins in the neck and epigastric pulsation. Anaesthesia involved mainly the legs and there was hyperaesthesia of the calf and thigh muscles. It was ascertained that other Somalis on the same diet as these but stationed some miles distant were suffering in a similar way. Altogether 18 cases are referred to. In short the signs were typical of beriberi, yet in some cases dry in others. Those most severely affected were taken into hospital and given injections of betaxin (10 mm). The others had their diet supplemented by maize meal $\frac{1}{2}$ lb daily and later ground nuts with beans.

Twelve days later two of the patients who, by reason of poor appetite, had not taken the full amount of food, still showed signs of neuritis but all the others had recovered.

The regular daily diet before the outbreak consisted of: Rice 1 lb, meat $\frac{1}{2}$ lb, ghee 2 oz, dates $\frac{1}{2}$ lb, sugar 2 oz, tea $\frac{1}{2}$ oz, salt $\frac{1}{2}$ oz. This had been the diet for six months (but meat for four months only). The author gives the results of analyses of these foods and shows that such a diet contains only 244 I U of vitamin B₁ instead of the necessary 360 or so. It is also deficient in calcium, vitamins A and D, and riboflavin and ascorbic acid. Beriberi as a rule takes three months to develop; consequently other Somalis who had been on this diet for only two months had up to the time of the inspection shown no symptoms. That the Somalis do not suffer from the disease in civil life is ascribed to the fact that they also have milk (cows or camels) and jouari, a form of millet, and at times eggs and whole meal bread. An instructive table gives the results of analyses of various Somali foods.

H Harold Scott

FERRO LUZZI G Neurite tropicale con blocco parziale del cuore
[Tropical Neuritis with Partial Heart Block] *Boll d Soc Italiana
di Med e Igiene Trop* (Sez Eritrea) Asmara 1942 v 1 No 4
5-17

The condition described—three cases in Europeans are detailed—presents certain similarities to tropical pseudo beriberi already recorded [see this *Bulletin* 1943 v 40 796] but differs in that in general the former is less serious and the symptoms are more subjective than objective and there are no signs of myocardial lesions. It is characterized by circulatory disturbances associated with partial heart block—cyanosis and dyspnoea—and by neuritis but there is no oedema or orthopnoea. The neuritis may accompany the cardiac disturbance or may follow it. The heart symptoms are due to a neuritis the bundle of His is not involved. Aetiologically and pathologically, i.e. pathogenetically says the author the condition is closely allied to pseudo beriberi but has not the characteristic affection of the legs nor any involvement of the cardiac musculature. The prognosis as regards life is good but as in all deficiency states if the conditions under which it arose continue relapses are common. Vitamin B is needed together with rest physical and mental. Camphor preparations give relief temporarily. Strophanthus and digitalis are without effect.

H Harold Scott

FERRO LUZZI G Rapporti tra beriberi classico e neurite tropicale degli europei [Relation of Beriberi to Tropical Neuritis in Europeans] *Boll d Soc Italiana di Med e Igiene Trop* (Sez Eritrea) Asmara 1942 v 1 No 4 18-22 English summary

Among Europeans states the author no case of beriberi was seen during the period 1937-41 either wet or dry in Eritrea in 1942 cases began to come to hospital. During the same period he saw six cases among the natives presenting typical symptoms and all between the ages of 20 and 30 years. They exhibited oedema of face and leg oliguria and muscular weakness. Later the oedema spread to involve the whole body and praecordial oppression and palpitation appeared. According to the author's experience and from a study of the records the natives do not suffer from the tropical polyneuritis which attacks Europeans. There is no close affinity between the two diseases because avitaminosis is not a cause of the tropical neuritis and he maintains the latter is not a geographical variety of beriberi and though vitamin B rapidly benefits true beriberi it has little or no effect on the other disease.

H Harold Scott

CIMMINO V Crave sindrome carenziale B successiva a febbre ricorrente [Severe Symptoms of Avitaminosis B after Relapsing Fever] *Boll d Soc Italiana di Med e Igiene Trop* (Sez Eritrea) Asmara 1942 v 1 No 5 45-50 English summary (4 lines)

Post infective neuritis may be ascribed to deficiency of vitamin B the febrile process leading to rapid using up of the vitamin especially when the patient has previously been living on the borderline of deficiency. So postulates the author and quotes the following case in support of his contention. A native youth of 17 years a prisoner passed through an attack of relapsing fever with spirochaetes in the blood

Seven weeks later he had slight fever with malaise and dyspnoea. The heart which when previously examined had been found normal was enlarged the blood pressure was 110/60 pulse soft small regular. No pyrexia could be found. The cardiac enlargement increased gradually and the patient began to complain of pain in the legs particularly along the nerves and some oedema of the face and legs appeared. Knee jerks were reduced. Achilles reflexes absent. Urine output small but no abnormality was detected in it. Anasarca became general the heart took on a gallop rhythm and death took place. Autopsy revealed little moderate pericardial effusion pericardial staining especially on the anterior aspect organ enlarged flabby musculature pale valves normal. Degeneration and stasis in the liver and renal degeneration. (not defined otherwise). *H. Harold Scott*

GREGORY, M. K. The Ocular Criteria of Deficiency of Riboflavin
Brit Med J 1943 July 31 134-5

This article should be read by all those who are interested in the subject which forms its title.

A few quotations from Dr Gregory's paper will best indicate what follows—

There has been a spate of enthusiastic but uncritical investigations. It is therefore necessary that there should be some attempt to clarify the confusion of thought and to correct the looseness of terminology that has arisen. It is essential that observer first should have an exact knowledge of the normal blood supply and arrangement of vessels at the limbus secondly they should have an accurate idea of the changes such in the light of our present knowledge may be expected to occur and thirdly they should know what other conditions may produce somewhat similar appearances and how these may be distinguished. I propose to give a brief outline of these three points.

The Normal Blood Supply of the Limbus. The pericorneal plexus is in two layers—the superficial conjunctival and the deep episcleral.

This deep ciliary congestion is always a serious sign as indicative of ocular disease but superficial circumcorneal injection can be transiently produced by vigorously rubbing the eye for a moment and it results from irritation such as exposure to wind cold bright light mild chemical irritants mild infection and numerous other causes.

Thus it is normal for a vessel to occupy the whole width of the limbus and there is not necessarily an avascular zone between the plexus and sclero-corneal junction and capillaries which do not extend beyond the limbus thus defined are considered to be within the limits of normal.

Ocular Appearances in Riboflavin Deficiency. The chief sign is a superficial invasion of the cornea by very fine capillaries arising from the apices of the marginal loops. These lie just deep to the epithelium and extend evenly as streamer-like vessels which anastomose to form a series of loops from the apices of which more capillaries grow toward the centre giving the appearance with the slit lamp of fine almost parallel vessels extending on to the cornea round the whole of its periphery in both eyes.

Other Causes of Corneal Vascularization. The cause of the most extensive vascularization of the cornea is interstitial keratitis. Some other conditions in which vascularization of the cornea may occur

are vitamin A deficiency tryptophan deficiency injury of corneal epithelium due to chemical irritants diseases causing pannus such as trachoma phlyctenular keratitis pannus degenerative and also any superficial keratitis

The author discusses these and concludes I would however advocate most strongly that those interested should acquire an accurate picture of the signs indicative of this deficiency so that large quantities of this expensive vitamin preparation will not be given empirically or unnecessarily and considerable time will not be wasted in investigating signs that have no real diagnostic value

H S Stannus

SEITZ W Ueber gastroenterogene Pellagra [Pellagra of Intestinal Origin] *Deut med Woch* 1943 Apr 30 v 69 No 17/18 365-7 2 figs [18 refs]

The patient a smith of 56 years had suffered on and off for nearly 20 years from gastric and intestinal symptoms In 1922 a gastroenterostomy was performed on account of gastric ulcer Since 1927 he had had pain after eating and once brought up blood From the middle of 1941 he had been much troubled with diarrhoea The stools showed occult blood and the patient had become emaciated An exploratory laparotomy was undertaken for suspected ulcer or malignant disease but neither was found In the following spring he complained of pain in the legs of a sciatic character and his tongue was fissured Exposure to the sun's rays while he rested in the garden in a *chaise longue* for an hour one day and a quarter of an hour the next was followed by blistering of the face and backs of the hands the only parts exposed When seen a few days later he presented the typical symptoms of pigmentation of exposed parts rhagades stomatitis atrophic lingual papillae dry and fissured fingernails The gastric juice contained no free HCl even after histamine Psychic symptoms comprised indifference to surroundings slow speech absent mindedness and lack of concentration and at times bewilderment Nicotinic acid 100 mgm Nicobion intramuscularly daily led to rapid amelioration of all symptoms except the diarrhoea Acting on the general idea that in pellagra the adrenals are not functioning properly the author prescribed this hormone but its use was followed rapidly by an alarming oedema This fact tends to support the notion that in pellagrins the oedema is not due to deficiency of the antipellagra factor but to some other vitamin (B_6) or reduction of protein [The condition of the hands is well shown in an illustration that of the face and mouth not so well as the photograph has been much reduced and not well reproduced]

H Harold Scott

RIORDAN T J GELLIS S & RUBINOWITZ A M Unusual Sites of Lesions in Pellagra Gangrene of the Toe in One Case *Arch Dermat & Syph* 1942 Nov v 46 No 5 661-4 3 figs

The common sites of the skin lesions of pellagra are the backs of the hands and the neck they are rarely found elsewhere (2.4 per cent in one large series) The authors report three cases of unusual distribution of these lesions—beneath the breasts in the intergluteal region and around the vulva and inner sides of the thighs There were lesions on the hands as well In one case an area of pellagrous

dermatitis on the great toe had led to local gangrene which necessitated amputation. All the patients were negroes and heavy drinkers all had mouth symptoms and two had peripheral neuritis. Nicotinic acid and thiamin were successfully used in treatment. C II

HANSEN PRUS O C Pellagra developing in a Patient receiving Liver Extract parenterally for Sprue *Southern Med J* 1943 June 1 36 No 6 440-42

In a series of 60 patients with the prue syndrome no instance of pellagra beriberi or scurvy accompanying the sprue state has been found.

When first studied the patient who forms the subject of this paper presented the complete picture of sprue cachexia from which he recovered satisfactorily with parenteral liver and dietary but when readmitted 17 months later he was suffering from unmistakable pellagra and recovered under treatment with nicotinic acid. The development of the pellagra state coincided with the progress of a pyloric obstruction with 6 per cent retention of barium, a stenosing ulcer was present in the duodenal bulb. When pellagra became manifest his blood haemoglobin and red cell values were within normal limits and the bone marrow had reverted from a megaloblastic to the normal type. Furthermore the stool fat content was within normal limits and the glucose tolerance test showed an increase in the blood sugar curve.

The sequence of events suggests that refined liver extract does not contain the pellagra preventive factor. P. Manson Bah

HAEMATOTOLOGY

RANDOLPH T G with the technical assistance of Elizabeth B GINSON Enumeration and Differentiation of Leukocytes in the Counting Chamber with Propylene Glycol Aqueous Stains *Proc Soc Exp Biol & Med* 1943 Jan 52 No 1 20-22

The known haematological and solvent properties of the glycols suggested the use of diluting and staining fluids for white cell counting. In a diluting fluid consisting of a 50 per cent aqueous solution of propylene glycol the erythrocytes became almost invisible within 5 minutes while the leucocyte counts remained unchanged for 60 hours. Furthermore owing to the viscosity of the glycol mixture an accurate end point was attained more easily in filling the diluting pipette and there was less settling and clumping of the cells in the pipette than with acetic acid diluting fluid. There was also less tendency to overflow the counting chamber when filling, less cell debris was seen in the background of the preparation and the mixture evaporated more slowly. The addition of eosin and methylene blue to the fluid allowed a differential count to be made with the 4 mm objective and avoided the disadvantages of unequal distribution of the cells and the difficulty of identification of smudge cells met with in smears but for complete differential counts the method could appear supplementary rather than an alternative to the use of stained films.

The most satisfactory results were obtained by making up two stock solutions. Solution I consisted of methylene blue 0.1 gm in propylene glycol 100 cc and Solution II of eosin B 0.1 gm in distilled water 100 cc. the eosin solution may require filtering occasionally as a fine precipitate may form on keeping. A mixture of equal parts of these solutions is used as the diluting fluid in a standard white blood cell counting pipette the total and differential counts being made in a standard counting chamber. The diluted blood should remain 15 minutes in the pipette for maximum staining and 3 minutes should be allowed in the counting chamber for the cells to settle.

F. Murgatroyd

RUBIANO GROOT H. Algunos conceptos personales sobre anemia de los trópicos y fisiopatología del edema en este síndrome [Anaemia in the Tropics and Associated Oedema] *Medicina* Bogota 1943 Mar v 5 No 51 65-96

This article occupies the whole of this number of the Journal. The author discusses the subject of anaemia in the tropics associated with intestinal disturbance diarrhoea or constipation anorexia headache weakness insomnia oedema and other vague symptoms and gives notes of a large number of patients presenting very similar histories. Of 51 such 38 were passing ova of hookworms one of *Strongyloides* and 12 had no such infestation. He concludes that tropical anaemia occurs without ankylostomiasis and ankylostomiasis without anaemia. He then proceeds to consider the pathogeny of oedema discussing cardiac renal and hepatic diseases and metabolic disturbances and finds that the oedema of tropical anaemia is consequent on hepatic inadequacy and a result of dietetic deficiency notably of vitamin B. He acknowledges that these cases may interact thus uncinariasis may lead to nutritional disturbance which in turn sets up the syndrome of tropical anaemia. Hence hookworm campaign units must in addition to getting rid of the parasite pay due attention to nutrition and nutritional defects. [There is not very much new in this but it is an interesting and careful study.]

H. Harold Scott

VENOMS AND ANTIVENENES

DE S. S. Antigenic Properties of Crystalline Haemolysin *Ann Biochem & Exper Med* 1942 v 2 No 4 237-44 [11 refs]

The immunological specificity of crystalline haemolysin from certain snakes has been tested. The activities of those from two varieties of *Naja tripudians* were 3360 and 3318 haemolytic units respectively per mgm that from *Bungarus fasciatus* was 1650 units. Antihaemolysin was obtained by injecting rabbits with 5 mgm haemolysin at intervals of three days for 30 days. Then to 1 cc of serum were added in a test tube 1 cc of haemolysin in various dilutions and 8 cc of 0.85 per cent NaCl. The tubes were examined after 30 minutes at 37°C. Ten cc of serum diluted 1/10 gave maximum precipitation with 1.5 mgm of the haemolysin.

By experiment it was found that the haemolysins of the two varieties of *Naja tripudians* were similar but that of *Bunarus fasciatus* was different as judged by cross precipitation and neutralized less than half the amounts of the former

The author also studied the effect of ultra violet light on the haemolysin and the effect of reducing agents on the irradiated products. It was found that a 1 per cent solution of the crystalline haemolysin was half inactivated within 10 minutes. The oxidized haemolysin was found to produce anti haemolysin in a proportion equivalent to that obtained from the active enzyme but the irradiated enzyme had lost this property. Further oxidized enzyme can be reactivated irradiated enzyme cannot. In other words crystalline haemolysin is irreversibly destroyed by exposure to ultra violet light. *H Harold Scott*

BOQUET P & VENDRELY R Influence du pH sur la transformation du venin de cobra en anavenin par l'aldehyde formique preparation d'un anavenin solide Influence of pH on the Preparations of Anavenene? *C R Se B I* 1943 Mar v 137 No 5-6 179-80

Solutions of cobra venom treated with formaldehyde lose toxicity more quickly in neutral or slightly alkaline solutions than in acid solution. The protein precipitate which is formed is equivalent to solid anavenene. *C II*

WALKER N T Two Cases of Spider Bite *South African Med J* 1943 Feb 13 v 17 No 3 44-54

These occurred in Madagascar. In neither case was the insect identified. The symptoms were intense general pain sweating (in one case of one side of the body only) rapid painful respiration and vomiting. Morphine was effective in relieving pain only after repeated doses but adrenalin relieved the respiration and cyanosis. In one case there was board like rigidity of the abdomen [similar to that described in bites of *Latrodectus mactans*].

Both patients recovered after a few days. *C II*

HALTER B L & KIZILL W C Black Widow Spider Bites in the Adult Male *Milit Surg* 1943 Apr v 9 No 4 427-32

Seventeen cases are reported all recovered. The treatment given included the intravenous injection of calcium chloride in doses of 10 cc of a 10 per cent solution. *C IV*

DERMATOLOGY AND FUNGUS DISEASES

REISS F Syringadentitis Suppurativa Tropicalis (a Complication of Lichen Tropicus) Histologic Appearance and Etiologic Considerations particularly as to a Possible Relationship of Ascorbic Acid and Carbohydrate Metabolism *J Lab & Clin Med* 1943 June v 28 No 9 1087-92 3 figs & 1 chart [37 refs]

Only a few patients suffering from prickly heat show severe involvement of the face but it is these cases who are most often subject to the

complication here discussed. Local itching may be absent or considerably attenuated being replaced by an increasing sensation of tension over the face (rarely over the buttocks or the submamillary regions). This is followed by the development of numerous painful superficial and deep nodules about the size of a split pea and larger. After being covered by a shiny red skin for some days suppuration appears or at times resorption seems to occur without the development of pus. Scarring is not a frequent sequel but some post inflammatory pigmentation often persists for many weeks after the active lesions have subsided. The twenty patients here considered were all Chinese and the course of the disease was from four to ten weeks. Histological and cultural investigations all support the expected findings of infection with staphylococci. Some evidence is brought forward which suggests that infection of the sweat glands occurs more easily where there has been excessive loss of vitamin C with some changes in the carbohydrate metabolism which may be summarized as a low fasting blood sugar level and delayed glucose excretion. Appropriate local applications were used whilst internal medication included the administration of ascorbic acid 200-1000 mgm daily. Neither the sulphonamide drugs nor toxoid gave encouraging results. *Sydney Thomson*

PINKUS H. Chronic Scarring Pseudofolliculitis of the Negro Beard
Arch Dermat & Syph 1943 June v 47 No 6 782-92 9 figs

Attention has been called to a peculiar disease which affects the bearded skin of a large percentage of negroes. It is due to the strong curved shaved hairs growing back into the skin and causing irritation, foreign body inflammation and eventually scarring. The clinical picture is characterized by hairs which extend for a short distance above and parallel to the surface, both ends being buried in the skin (loop hairs *poils recourbes* of DUBREUILH *pili recurvi*). The follicle of the hair is normal while there is an inflammatory papule or papulopustule around the free end. Later in life inflammatory reaction is less pronounced and the hairs lie in shallow grooves. Still later the hairs degenerate leaving the skin criss crossed by narrow depressed scars which give the cheeks of many of the older men a characteristic appearance. The designation of chronic scarring pseudofolliculitis (pseudofolliculitis chronica cicatrisans) is proposed for this condition.

Histologic examination by means of serial sections and three dimensional large scale reconstruction (Dr Felix PINKUS) has shown that there is a fundamental difference between ingrown hairs of straight wavy or curly beards and the loop hairs causing pseudofolliculitis. The ingrown hair of a white man is a hair which has been shaved too close, has slipped back beneath the surface and owing to continuing growth has made a false path through the side wall of the follicle into the cutis instead of emerging at the follicular opening. The negroid hair emerges normally but owing to its inherent curve grows back into the skin if it is not shaved close enough. *Sydney Thomson*

SATULSKY E. M. & WIRTS C. A. Dermatitis Venenata caused by the Manzanillo Tree. Further Observations and Report of Sixty Cases
Arch Dermat & Syph 1943 June v 47 No 6 797-8

A further report is made on the irritating action of the manzanillo (beach apple or shore apple) tree found in the Republic of Panama and the Canal Zone.

A brief summary of 60 cases of dermatitis venenata caused by the tree is reported

SIGALOS P Die chirurgischen Mykosen in Griechenland [Surgical Mycoses in Greece] *Deut Ztschr f Chirurgie* 1943 Mar 24 v 257 No 5 & 6 303-15

Hitherto cases of mycotic infection in Greece have been recorded individually the author has studied these and in the present article (which has been published also in Greek) he deals with the subject more generally but does not state over what length of time these have been distributed He divides them into three classes Actinomycosis Streptotrichosis and Blastomycosis

I *Actinomycosis*—Forty four cases are analysed forty proved bacteriologically four clinically only In addition there were 12 cases of mycetoma of the foot The youngest patient was 12 years the oldest 70 years of age six were between 12 and 20 then in successive decades 13 12 11 9 and five In 23 the face and neck were involved in 10 the lungs and pleura in another 10 the abdomen in 20 the foot and in one the lower jaw (not included in the face and neck cases) In 22 of the face and neck cases the organism was isolated The lesions were generally distributed—neck jaw parotid submaxillary regions the gums In the thoracic cases lungs and pleura and the walls were involved with fistulous formations and abscesses and autopsies might reveal metastatic deposits in other internal organs Abdominal lesions were largely confined to the wall but the bowel might be involved mainly at the junction of the ileum and caecum The foot cases were all in peasants most of them engaged in agriculture or cattle rearing From nine of these *Actinomyces madurae* was obtained from three *Indiella cister*

II *Streptothrix*—Thirty of these were found the localizations of the lesions were Face and neck 8 lungs and pleura 8 abdomen 5 kidneys 2 bones 2 soft parts of the limbs 3 multiple two The disease was characterized by chronicity and tendency to relapse From most of them an anaerobic streptothrix was isolated The pulmonary form was very likely to be misdiagnosed in the earlier stages at least as tuberculosis and in fact in more than one phrenic avulsion or artificial pneumothorax as performed In three of the five abdominal cases the wall was involved in two the retroperitoneal aspect of the caecum The two kidney cases were exclusive of those in which these organs were invaded by metastases There were pyonephrosis and perinephric abscess The bone cases like the pulmonary were by many regarded as tuberculous Those with wide distribution whose original site could not be determined showed lesions of liver shoulder girdle sternum temporal region axilla and abdominal wall

III *Blastomycosis*—Only a few of these were seen or found (the number is not stated) In one the wrist was involved in another the lung in a third a kidney

Non surgical mycosis is briefly mentioned notably of the eye and ear duct nose mouth and skin the cause being *Streptothrix* or *Trichophyton* (*T. violaceum*) or *Aspergillus*

Treatment apart from surgical operation (removal of the affected area amputation of foot etc) comprised mainly potassium iodide in large doses Fat subjects tolerated very large doses one man taking as much as 39 gm in one day and a total of 90 gm Iodine in alcohol or

glycerin might be applied locally but strong preparations damaged the tissues and prevented absorption X rays without administration of iodide proved ineffectual
H Harold Scott

MISCELLANEOUS

- TOVAIN A H The Transkei Division *South African Med J* 1943 May 22 v 17 No 10 151
MEARS G The Transkeian Territories *Ibid* 151-2
TOBIAS J M Medical Practice in a Typical Transkeian District *Ibid* 152-3
PATERSON R L Medical Missions in the Transkei *Ibid* 154-6
TONIN A H The Registration of Births and Deaths of Natives *Ibid* 156
MEARS A R R One of the Profession *Ibid* 157-8
JOYNT E P H The Butterworth Area *Ibid* 158
SOUTH AFRICAN MED J 1943 May 22 v 17 No 10 159-66 Medical Problems of the Transkei [Discussion]

The whole of this issue of the *South African Medical Journal* is devoted to the medical problems of the Transkei. To this extent it is of course of local importance but most of the major issues may well have an application to African territories beyond the Union. It is noteworthy that most of the contributors have from their different experiences reached the same conclusions namely that the overriding factors in health are deficiency of nutrition and ignorance and urge that unless these matters are efficiently and promptly dealt with there can be no likelihood of improvement in health. They realize moreover that improvement in nutrition can only be achieved by improved agriculture and animal husbandry.

Mears points out that though for agriculture and stock raising the country is well suited it has now become saturated with beasts especially sheep and that as a consequence many animals die through starvation. Other contributors show that animals are not commonly kept for their food producing capacities but rather as evidence of wealth that the milk yield is falling because of overstocking so that in many areas milk is hardly available as a human food that soil erosion is increasing that rotation of crops is not practised and that the land is therefore deteriorating. The result in man is malnutrition so severe that fifty or sixty per cent of the children die through malnutrition before reaching the age of two years.

Mears states that the population is not ravaged by any specific disease but others show that tuberculosis is fast assuming the proportions of a major health problem and relate the increase partly to the poor standard of living and partly to contact infection within the ill ventilated huts in which the families live. Venereal disease though fairly common is not regarded as a principal risk. De Villiers notes that plague and typhus break out each year in some part of the Transkei.

Of the nutritional diseases Tobias particularly mentions nutritional oedema as a cause of the high infant mortality rate which he estimates

at about 70 per cent. Scurvy and pellagra are mentioned by Paterson who also refers to more latent forms of dietary deficiency but it is generally conceded that these deficiencies are widespread.

Contributors to this discussion make constructive suggestions for improvement which are by no means merely vague generalizations but the details cannot well be abstracted. No doubt many of these are mainly applicable only in the existing circumstances and would need modification for other countries but there is little doubt in the mind of the reviewer that Government authorities faced with similar problems in other countries would benefit by a detailed study of the many proposals here laid down. In general the impression received is that the attitude tends to be too much an individualist and therefore farms uneconomically when economy is necessary even for minimal tolerable existence. It is considered that some degree of compulsion is necessary to constrain the people to a more fruitful mode of life that the situation has become such that less forceful methods are likely to fail. The emphasis is on the basic subject of efficient farming.

The minutiae of these subjects are discussed at some length but cannot be reproduced in an abstract. They include not only the specific proposals as to the improvement of agriculture but also suggestions concerning the provision of adequate medical facilities. It is clear however that the contributors to this important issue of the *Southeast Asian Medical Journal* are fully aware that the well-being of the people can only be attained by close co-operation between Government and all the relevant technical services—medical, agricultural and the rest. There is nothing new in this attitude but it is well that it should be so emphatically stated. C II

BROWN, G. St. J. Orde. *Labour Conditions in Ceylon, Mauritius and Malaya*. Cmd 6423. 113 pp. 4 diagrams. 1943. London: H.M. Stationery Office.

This report is concerned with all aspects of labour conditions but there is considerable mention of the health of the labourers. The author who has had long experience of this kind of work criticizes and discusses such matters as housing, sanitation and diet of plantation labourers. No detailed abstract of his findings is possible but the suggestions he makes should be brought to the notice of all Government officers and plantation managers of the countries concerned and even be considered since some of them are of very wide application. For instance he urges that specialist appointments should be given to medical officers who have experience in the problems of labour so that they may better supervise and co-ordinate the work. He also mentions the unfortunate experiment of Bell Village in Mauritius where a housing scheme was started 15 years ago but was not a success because the buildings were unsuitable, the lay-out was not liked by the natives and the area was malarious—a melancholy example of a promising scheme carried out with insufficient foresight and experience.

There are many constructive suggestions throughout the report.

C II

COLONIAL OFFICE. *Labour Supervision in the Colonial Empire 1937-1943*. Colonial No. 185. 26 pp. 1943. London: H.M. Stationery Office.

MEDICAL RESEARCH COUNCIL **The Medical Use of Sulphonamides**
M R C War Memorandum No 10 46 pp 1943 London H M
Stationery Office [9d]

This monograph has been written by a number of authors for the Therapeutic Requirements Committee of the Medical Research Council as a guide to the use of sulphonamides in the light of their present or potential availability in Great Britain. It deals first with the chemistry and nomenclature of the principal compounds and with their behaviour as drugs—mode of action absorption distribution acetylation and excretion—a table of solubilities including those of acetyl compounds in water serum and urine is given. The general principles of treatment are then described and a comprehensive scheme of dosage is given with a discussion of administration by different routes and of the regulation of dosage by estimating the sulphonamide level in the blood. The main specific infections amenable to treatment are then described some being classified according to the causative organism and some regionally—e.g. peritonitis urinary tract infections wounds burns. In the second category there is much up to date information on the effect particularly of sulphaguanidine and succinyl sulphathiazole in various intestinal infections. Shorter accounts are given of what is known of the treatment of 16 other miscellaneous conditions. There can be very little of any value which is omitted from this comprehensive survey although some specific reference might perhaps have been made to subacute bacterial endocarditis non haemolytic streptococcal infections are mentioned only in general terms with a warning that they are rarely susceptible to treatment. There is a full description of toxic reactions with a table of the reported frequency of 25 such effects following the administration of four different compounds. An appendix gives methods for estimating sulphonamides in body fluids for determining the susceptibility of a micro organism to sulphonamides and for sterilizing sulphanilamide powder for local application. There is no bibliography but some references mainly to recent or not generally familiar work are given in the text.

This memorandum is a comprehensive and reliable guide to sulphonamide therapy in all its aspects which should do much more than ensure that drugs in short supply shall be used to the best advantage. It is a model of concise exposition and the reader will find it difficult to believe on reaching the end of it that all the information it contains has been compressed into so small a compass. *L P Carrod*

GOKHALE P V **Note on the Sindawe Tribe of the Kondoa Irangi District Tanganyika Territory** *East African Med J* 1943 Feb
v 20 No 2 62

In the examination of 1500 recruits in the Kondoa Irangi district of Tanganyika Territory Gokhale noted the absence of tropical ulcer in members of the Sandawe tribe. It appears that members of this tribe keep themselves aloof from neighbouring peoples do not travel to seek work but are great hunters and collectors of wild honey. They are poor agriculturists and most of the grain (millet) they grow is used to make beer. Their diet consists of meat milk honey cassava and sweet potatoes and they like dried fish. This diet should give a high blood calcium and if tropical ulcer is associated with low calcium

values this may be an explanation of their freedom. As they do not eat vegetable the availability of the calcium in the diet is not reduced by the presence of oxalates.

In other tribes in the same district ulcers are very common.

C II

ROPER, F. Das hamostatische Geschwür in warmen Ländern [The Haemostatic Ulcer in Warm Countries] *Deut Trop Ztschr* 1943 Apr 15 v 47 No 8 181-93 [10 refs]

This is a theoretical discussion of the causes of tropical ulcer based on observations of about 50 cases in the North African war areas and earlier experience in German East Africa. The author thinks that tropical ulcers are caused by injuries often very slight to parts of the skin with diminished vitality such as the ankle and foot. This diminished vitality is brought about in African natives by their changed habits of life produced by contact with European civilization. In his natural surroundings the African native moves about or squats or lies down but rarely stands for long periods or sits on forms, chairs or stools as he does when in the service of Europeans. This standing or sitting without support for the tissues of the leg interferes with the venous return of blood and so the vitality of the skin and superficial tissues is impaired. The support given by tight clothing such as puttees will prevent the occurrence of tropical ulcer. The state of health and nutrition of the body plays a minor part. In the Mediterranean war area the native population who do little standing and sitting and clothe their legs and the British troops who wear puttees are almost free from tropical ulcers while German soldiers living under the best hygienic conditions but who are given more liberty in regard to clothing suffer greatly from tropical ulcer.

The ulcers were nearly always on the leg or foot but the author saw one on the lower part of the thigh, one on the wrist and two on the neck. He never saw an ulcer on the front of the knee although it is often injured and this is probably owing to a good blood supply to this part. Usual methods of local treatment are mentioned. J F Corson

BROCKLEBANK, J. A. The Radiological Appearances of Bone in Cases of Tropical Ulcer *Brit J Radiology* 1943 Aug v 16 No 188 221-4 15 figs

Tropical ulcer begins as a pustule usually near the ankle which rapidly develops into a painful sloughing ulcer with much purulent discharge and the deeper tissues including bone may be affected. The author describes the radiological appearances in some of these cases. Involvement of bone begins as periostitis then the inflammatory process extends to the underlying cortex producing osteo periostitis with superficial erosions of the bone. The author believes that if this stage is reached osteomyelitis always follows usually within three months and often affects the whole length of the tibial diaphysis. He has not observed involvement of the epiphyses. It is remarkable that with such extensive bone lesions there may be little impairment of general health and activity. It may be difficult to differentiate the radiological appearances from those found in yaws and syphilis both of which are common in West Africa. The author has also observed very singular appearances in England in a case of osteomyelitis due to *Bact coli commune*.

J F Corson

PLACEO F Contributo clinico su 50 casi di ulcera tropicale in bianchi trattati con metodo chirurgico (circoncisione) [Fifty Cases of Tropical Ulcer in Europeans Surgical Treatment by Peripheral Excision] *Boll d Soc Italiana di Med e Igiene Trop* (Sez Eritrea) Asmara 1942 v 1 No 4 48-53

The author does not touch on the pathology or aetiology of tropical ulcer. All he is concerned with is to describe a form of treatment which has proved very successful in his hands. Even severe ulcers of long standing have healed and cicatrized in at most seven weeks and often in 30 days. The patients are kept in bed for 15-20 days. During the first 4-8 days the ulcer is cleaned by allowing Dakin's solution to drop on it twice daily for an hour at a time. In the intervals a protective ointment is applied. Then the skin is incised down to the fascia at a distance of 1-2 cm from the margin of the ulcer in order to cut off completely the superficial blood supply. This procedure which the author designates 'circumcision' is followed by scraping of the granulations with a Volkmann's spoon and the application of a simple ointment. This is removed 48 hours later and sterile vaseline is applied daily until cicatrization is complete. *H Harold Scott*

WALKER J W & CHARTERS A D A Case of Leech Infection *East African Med J* 1943 Apr v 20 No 4 114-16 1 fig

An Abyssinian boy about seven years old was seen to be suffering from severe epistaxis. He complained of sore throat and bleeding from the nose and mouth of two days duration. He was faint and anaemic. Blood cell counts could not be made but the haemoglobin was found to be 40 per cent. Examination of the throat showed a round sessile tumour about one inch in diameter attached to the posterior surface of the right tonsil and there were two petechial spots on the right anterior pillar of the fauces. A diagnosis was not made pending further examination under an anaesthetic and next morning he was reported to have coughed up a worm which proved to be a large leech. It measured four inches in length when extended and had a basal sucker half an inch wide and was afterwards identified as belonging to the genus *Limnatis*. Observation indicated that it was aquatic in habit and it is thought that the boy became infested through drinking water some time previously when the leech was small as MANSON BARR suggests (*Manson's Tropical Diseases* 1941 p 806) *J F Corson*

WHITE T H Primary Lateral Sclerosis or Lathyrism? Case Report *East African Med J* 1943 Apr v 20 No 4 121-2

A young adult male native was admitted to Tanga hospital (Tanganyika Territory) complaining of backache pain in the leg and inability to walk of a fortnight's duration. There was spastic paraplegia the knee and ankle jerks were increased the plantar reflex was of extensor type and ankle clonus was present. Sensation was not diminished. The Wassermann reaction of the blood and cerebrospinal fluid was negative. There was no evidence of avitaminosis and the symptoms suggested lathyrism. The patient improved slowly during the seven weeks of the author's observation and at the end of this period he could hobble around with the aid of a stick.

J F Corson

MARSHALL J F The Control of Tank breeding Mosquitoes in the City of Portsmouth 1943 June 4 pp British Mosquito Control Institute Hayling, Island Hants

The author has had a very large experience searching for early stages of mosquitoes in static water tanks of many sizes and materials. He finds *Culex pipiens* not very rarely, the eggs being first observed in May and the larvae in June and the last larvae in October. He also finds larvae of *Anopheles maculipennis* occasionally. No other species was found. The smaller tanks (5 to 10 thousand gallons) are more frequently infested than the larger.

The paper demonstrates that the whole matter is very unimportant from the point of view of health or comfort for the *Culex* does not bite man and the *Anopheles* not very commonly at least in Britain. The author doubtless might not argue that it is not necessary to apply oil or the larvicide method unless larvae have been actually found.

P A Buxton

E E G CHABEL RD R & AB NEN E Les moustiques de la Guyane III Le S bethinés () [Mosquitoes of Guiana Sabethinés] *A h I t Pa te r d Algé e* 194 D c 70 No 4 336-48 7 figs

SE E ET G & ABOU NE C L Les moustiqu de la Guyane IV-7] Le genre *Aedes* (*g F la*) [Mosquitoes of Guiana *Aedes* *A h Inst Pa te r d Algé e* 194 D 0 No 4 349-51 1 fig

TAYLOR F H Contributions to a Knowledge of Australian Culicidae No V P o *Linn Soc N S W* Sydney 1947 v 67 Pt 3-4 277-8 8 figs [Summary taken from *Rev Applied Entom Ser B* 1943 July 31 Pt 7 11]

This paper which is the continuation of a series comprises records of *Aedes aegypti* L. from Fremantle in Western Australia and six localities in New South Wales that constitute the southern limits of its range and of *Anopheles punctulatus* var *australis* S & Sw from three places in Queensland. The latter was taken at Cairns and Innisfail with *A. annulipes* Edwards and small numbers of *A. annulipes* Walker. Characters are given distinguishing it from *A. annulipes*.

ESAKI T A Preliminary Report on the Entomological Survey of the Micronesian Islands under the Japanese Mandate with special reference to the Insects of Economic Importance *Proc 6th Pacific Sci Con* 1939 v 4 407-15 [Summary taken from *Rev Applied Ent Ser B* 1943 July v 31 Pt 7 131]

This paper is compiled from observations made in 1936 and 1938 and much of the information in the section on Arthropods of medical importance has already been noticed. Apparently no dangerous mosquito-borne diseases occur on the islands but dengue presumably transmitted by *Aedes aegypti* L. or an allied species, has broken out frequently in the Palau Islands since the Japanese occupation. It is believed to have been introduced by immigrants from the Loochoo

Islands A large tick probably *Rhipicephalus sanguineus* Latr is often found among weeds in the Marianne Islands. Notes are given on dermatitis caused by unidentified mites and on bees wasps and ants that attack man. Various species of Oedemerids of the genus *Eobia* which cause inflammation on the skin are abundant on all the islands.

PARROT L. Notes sur les phlébotomes XXXIX A propos de deux prophlébotomes d'Algérie *Phlebotomus minutus* var *signatipennis* et *Phlebotomus fallax* [*Phlebotomus minutus* var *signatipennis* and *P. fallax* in Algeria] *Arch Inst Pasteur d'Algérie* 1942 Dec v 20 No 4 322-35 8 figs [31 refs]

LAPUISHEV D A. Sur la parasitologie de creeping disease en Sibérie [The Parasitology of Creeping Disease in Siberia] *Med Parasit & Parasitic Dis* Moscow 1940 v 9 No 4 392-400 3 figs [50 refs] [In Russian]

SEMENOVA N L. Un cas de creeping disease [A Case of Creeping Disease] *Ibid* 401 1 fig [In Russian] [Summaries taken from *Rev Applied Entom* Ser B 1943 July v 31 Pt 7 127]

In the first paper a detailed account is given of five cases of subcutaneous myiasis of the face and one of the finger observed in 1930-39 in western Siberia. In each case only one larva was present. Four of them including the one from the finger were extracted and proved to be first instar larvae of *Gastrophilus intestinalis* DeG. Since in all the facial cases there was close contact with horses the author suggests that the newly hatched larvae may have been carried from horses to the face by the patients themselves especially as two of the latter recorded a definite sensation of stinging prior to the development of the myiasis.

In the second paper a case is described of myiasis on the abdomen and chest of a young boy who lived near Moscow and had close contact with horses. Attempts to remove the larva were unsuccessful.

MENG C H & WINFIELD G F. Studies on the Control of Fecal borne Diseases in North China. XV. An Approach to the Quantitative Study of the House Frequenting Fly Population. C. The Characteristics of a Rural Fly Population. *Chinese Med J* 1942 Oct v 61A No 1 (Chengtu Edition v 1 No 1) 18-19.

[We are indebted to Dr Joseph NEEDHAM FRS for the following summary which was received before the original journal had arrived at the Bureau. Dr Needham was in China as a representative of the British Council.]

A total of 101 481 flies were trapped by standard methods in nine indoor and nine outdoor stations in four villages of the Lungshan rural area of West Shantung between May and September 1937. *Musca vicina* was the dominant species in the indoor stations comprising from 81.5 to 100 average 94 per cent of the population with a density index of from 6.7 to 44.3 average 18.9 for the nine stations—this species appeared in June and was present in the largest number in August. *Chrysomya megacephala* was the dominant species of the outdoor stations making up from 37.0 to 58.5 average 47.9 per cent of the

population with a density index of from 48.7 to 374.1 average 191.6—this species appeared in late June and reached a peak in August. The Other Species Group is the next most important comprising from 22.6 to 61.6 a crude 44.8 per cent of the population with a density index of from 63.4 to 422.0 average 177.5 and was already present when trapping started in May and built up to a peak in July. The Other Species Group was equally dense out of doors in both areas although it made up a bigger percentage of the outdoor population in the rural than in the urban area as did the various important species of this group. Among this group both *Muscina stabulalis* and genus *Sarcophaga* were definitely more dense in the urban than in the rural area, the indices for *Lucilia sericata* in the two areas were approximately the same while the index for the Miscellaneous species was definitely much higher in the rural than in the urban area.

[For parts XIII and XIV of this series see this Bulletin 1942 v. 39 650]

NICHOLAS L. *Demodex Folliculorum* its incidence in Routine Histologic Study of the Skin. *Arch. Derm. & Syph.* 1943 June 47 No. 6 793-6 1 fig.

The author has examined 1750 sections of human skin submitted for routine histological study. He calls attention to the characteristic appearance of a fragment of the mite *Demodex folliculorum* as it appears in a stained section and publishes a photomicrograph showing parts of several mites in a hair follicle. The striations on the cuticle of the mite [wrongly referred to as segmentation] are clearly visible in the figure.

In the 1750 specimens, all or nearly all of them from abnormal skins, one may suppose mites were detected in 40 (2.3 per cent). They were associated with various types of naevus (11 cases), epithelioma (17) and a variety of other conditions. They were much commoner on the face (37) and particularly the nose (9) than other areas; indeed they were very unusual on the trunk.

These results support the view that the mite is not pathogenic. [It is not possible to assess the work for no data are given as to the number of skins without mites in the various groups. For instance were naevi and epitheliomata particularly frequent in the series? What proportion of the total was from the face or the trunk?] P. A. Buxton

HIRSH J. Comfort and Disease in relation to Climate. Yearbook of Agriculture 1941. Washington 237-45 [10 refs.] [Yearbook Separate No. 1798] [Summary appears also in Bulletin of Hygiene]

People in every region are interested in how to be comfortable and healthy under a given set of climatic conditions. In the present paper the author discusses the way in which the human body adjusts itself to changes in temperature and humidity, together with the remedial measures which can be applied under adverse conditions. The influence of climate upon disease is also briefly reviewed.

The body automatically maintains a nearly constant temperature by the regulation of internal heat production—the metabolic rate—and the control of heat retention and heat loss through respiration, blood

circulation and secretion by sweat glands. During cold days the blood vessels near the surface of the skin contract and lie deeper in the skin this conserves the body's heat and the skin appears pale and pinched. On warm days however or under conditions of physical activity the surface blood vessels dilate and the skin takes on a rosy hue. The blood carries heat to the surface where it can be lost to the air. Heat is also lost in the evaporation of sweat and in exhaling.

Subjective sensations of comfort however depend not only upon temperature but also upon air movement air humidity and the radiation effects from surrounding surfaces. In assessing an environment the effect of combining some of these factors must be considered. Thus the American Effective Temperature scale takes note of the temperature humidity and rate of movement of the air while the British Equivalent Temperature scale combines air temperature air movement and the radiation component.

The major problem in controlling indoor atmospheres is to maintain the balance between heat production and heat loss in the body. In the Temperate Zone people spend a considerable part of their time outdoors where they have no control over atmospheric conditions. In conditioning homes in these latitudes therefore indoor temperatures should approximate outdoor conditions as much as possible without detracting from subjective comfort. In other words houses should not be kept too hot in winter or too cool in summer.

Diseases caused directly by climate are few in number. Among the more familiar ones are heat exhaustion heatstroke snow blindness frostbite and mountain sickness. Climate has an indirect influence also in favouring or inhibiting the growth and virulence of some of the microscopic organisms that cause disease. This is especially true of malaria parasites and hookworms the causal organisms require special conditions of temperature and moisture in order to live. Many other diseases such as the common cold pneumonia and infantile paralysis show the effects of some climatic factors by exhibiting a seasonal pattern. The greatest number of cases of the common cold for example occur during the winter months and the least during the summer months but how far these effects can be due to changes in temperature and humidity etc is difficult to determine.

C G Warner

BOOK REVIEWS

CULBERTSON James T. [Assistant Professor of Bacteriology College of Physicians & Surgeons Columbia University] *Medical Parasitology*—pp xii+285. With 16 figs & 21 plates. 1942. New York. Morningside Heights. Columbia University Press. [\$4.25].

This is a book which can be recommended as giving a clear orderly and well balanced account of human protozoal and helminth infections their causes diagnosis treatment and prevention and their chief vectors. The spirochaetal infections do not come within the scope of

the work so that rat bite fever spirochaetal jaundice syphilis and vasis are not dealt with there is reference to relapsing fever in relation to its vectors

The volume is well illustrated and there are many excellent photographs. A photograph of a man with elephantiasis is convincing enough but photographs of sections of tissue containing parasites have as a rule a teaching value which is hardly commensurate with the labour and money spent on them. On occasion such photographs may be required in order to convince the sceptic but he must be a knowledgeable sceptic. What the student at the microscope sees in a stained section will usually convey a great deal more to him than a black and white photograph of the section. Even the aid of an arrow which aims pointedly at the parasites in the tissue may fail to make their presence as evident and their relationship is intelligible as would a simple sketch.

Definitions are likely to remain a difficulty until some authoritative body lay down common acceptance. The author gives the following definitions. *Infection* The establishment of a parasite within a host with or without the development of symptoms. *Infestation* The presence of parasites externally upon a host or in the environment. Is a person who is afflicted with scabies or cutaneous myiasis to be regarded as infected or infested? *Infection* appears to meet the majority of cases pretty well. *Pre-patent period* The time between invasion by a parasite and the recovery from the patient of some stage of the parasite development. *Incubation period* The time between invasion by a parasite and the appearance of clinical symptoms. Surely the word incubation can be used for that period which has elapsed before the parasites are seen and also for that period before the symptoms appear if it is preceded by such words as parasite or parasitic in the former case and clinical or febrile in the latter.

With reference to different specific names for parasites which appear identical a case in point is *Leishmania*. Three species of *Leishmania* infect man. *Leishmania donovani* which causes the visceral infection kala-azar and *Leishmania tropica* and *Leishmania brasiliensis* which cause cutaneous (Oriental sore) or mucocutaneous (espundia) infections respectively. The parasites responsible for these several disease entities are indistinguishable in morphology but the diseases are easily differentiated. It is debatable whether or not it is desirable to retain the disease names if the parasites causing the diseases are in reality morphologically indistinguishable. Nodular and nerve leprosy may appear in the guise of different diseases but it is not as yet believed that they should be attributed to different species of organism.

With regard to the order followed in the book it is on much the usual lines the first chapters being largely devoted to a broad consideration of the whole field. Most of us who engage in teaching such a subject as parasitology arrive after some years at a stage when we feel that we can take a somewhat wide view of the subject. It is in fact about this time that we decide to write a book and that is perhaps where we go wrong. One result is that feeling able and willing to make generalizations we are inclined in the introductory chapters to discourse over the whole field with copious allusions references and illustrative examples. Only after having given this general survey do we come down to the facts. But it is these very facts that students ought to learn first one by one just as we ourselves originally had to learn them. In the first chapters of this book the student will find himself much out of his depth. He will not know more than the names

to which the author refers he has as yet been given no instruction about the parasites to which they belong. A great deal of what is contained in the very useful general chapters up to about number seven would probably prove of greater educative value to the student if it were placed after Part II. By then but not before will he know what *Endamoeba histolytica* and *Trypanosoma gambiense* are, what *Necator americanus* and *Ancylostoma duodenale* mean and the significance of *Wuchereria malayi*, *Glossina palpalis*, *Chrysops* and so on.

In the malaria section *Plasmodium ovale* takes its place as a definite species. As regards the treatment of malaria the merits and demerits of quinine, mepacrine and primaquine are briefly discussed. There is one serious critical comment which it seems necessary to make here. On page 137 the following statement is made: "At the present time the point of view is taken that the drugs themselves seldom cure malaria. They seem instead merely to check the development of the parasite. The final eradication of the causal organism results from the action of the immune mechanism of the host upon the parasite. Hence present practice dictates particularly in endemic areas where reinfection is probable that drug treatment be withheld until the patient has suffered five or six severe attacks of fever and has thus had opportunity to develop immunity." It appears to the reviewer that to follow such advice is likely to expose to grave danger many malaria patients in those endemic areas where *P. falciparum* occurs.

D. B. Blacklock

TURNER Percy E. [M.D. B.S. D.P.H. etc.] *Tropical Medical Manual For Use and Guidance of Salvation Army Officers on Missionary Service*—pp viii+108. Third Revised Edition. With an Illustrated Appendix of Fifty Exercises. Issued by Authority of the General. 1942. London: International Headquarters, 101 Queen Victoria Street, E.C.4.

One of the most difficult undertakings is the writing of a book on medical subjects for non-medical readers. There is the ever-recurring problem of what to leave out, which is every bit as important as what to put in. In order to solve this satisfactorily the author must know thoroughly the mental capacity of the people he is addressing, so that the little learning may not become the dangerous thing. At the same time in circumstances where men and women are in responsible positions far from qualified medical assistance, the instructions imparted must be direct, dogmatic and sufficiently detailed.

Colonel Turner has fulfilled this task admirably. The book is divided into four parts and there is included a chart of fifty exercises for keeping fit. The first section deals with general principles of prevention of disease and preservation of health—exercise, food, drink, clothing and so on, with special subsections on the care of European children in warm countries and on the methods of dealing with rodent and insect pests.

The second and longest section is given up to diseases and their causation, diagnosis and treatment, including nursing. These are arranged alphabetically for facility of reference and perhaps this is as good an arrangement as any for the laity, though a full index with which the book is provided renders it almost unnecessary. Section C is a short one of four pages of Surgical Notes on cuts, bruises, burns, snake bite and stinging insects. The final Section is concerned with

remedies including a list of drugs and equipment which should be kept readily available and prescriptions and doses of medicines and dispensing instructions for preparation of lotions, powders, etc.

Misprints are very few: the reviewer has noticed only half a dozen. Incidentally, Dr. H. B. G. Newham is called Newman.

We would like to make one or two suggestions for the author's consideration for future editions. First that it is good to have calico extensions to mosquito nets for beds so that the sleeper does not on a hot night thrust arm or leg against the mesh and so expose himself to biting insects. Second that where mosquito-proofing of a house is undertaken the doors should open outward only. Thirdly regarding the enteric group of diseases no mention is made of carriers or the dangers of convalescent and recovered patients not being scrupulously clean and carefully washing the hands after defecation and urination nor of the risk of carriers having to do with preparation of food. Fourthly though yellow fever is graphically described and suggestions made as regards treatment nothing is said about protective vaccination for those proceeding to yellow fever countries. This omission is strange in that inoculation against the enterics is given prominence.

The author states (page 56) that hepatitis occurs in persons who have previously had an attack of amoebic dysentery but does not add that this may have been months or even years previously and the layman may think that it follows directly. Again Hepatitis may go on to liver abscess but usually only in people given to excessive alcoholic indulgence savours of the dicta of abstinence enthusiasts rather than the considered statement of a scientist and in fact is not in accordance with the experience of most workers in the tropics.

We understand that this book is for the use and guidance of Salvation Army Officers and is not obtainable by others. This is a pity for there is no book of its size so good so comprehensive and so succinctly written and missionaries of all denominations would profit much from having it to refer to in difficulty.

H. Ha old Scott

BUREAU OF HYGIENE AND TROPICAL DISEASES

TROPICAL DISEASES BULLETIN

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MALARIA

COGGESHALL L T Malaria as a World Menace *J Amer Med Ass*
1943 May 1 v 122 No 1 8-11

A very large proportion of the American Army is serving in parts of the world in which malaria is hyperendemic. The author paints a very gloomy picture of the possible consequences not only to the soldiers themselves but also to their homes to which they will return bringing new strains of plasmodia with them. The potential danger of malaria during the present war is a greater worldwide menace than ever before. [Such forebodings are natural enough to all who have worked in malarious countries but as there appears to be so little that can be done to falsify them it is of doubtful wisdom to give them undue publicity.]

Norman White

ZOZAYA C Paludismo y arrozales [Malaria and Rice Fields] *Rev Facul de Méd Bogotá* 1943 Feb v 11 No 8 448-76

ROSS E S & ROBERTS H R Mosquito Atlas Part I The Nearctic Anopheles Important Malaria Vectors of the Americas and *Aedes aegypti* *Culex quinquefasciatus* pp I iv + I 44 numerous figs (1 map) 1943 May 28 Philadelphia American Entomological Society 1900 Race Street [\$ 60]

The authors' idea is original. The atlas consists of a number of full page text figures of larvae and adult anophelines. For each species the same set of parts is illustrated *e.g.* for adults wing mouthparts hind tarsus mesonotum male terminalia phallosome and claspers. There are a few extra plates giving a map of the races of *A. maculipennis* in N America two domestic culicines and *A. gambiae* (which might again claim citizenship in the New World). The work is produced as a pamphlet but all pages are pierced so that they could be separated and used in a loose leaf cover. This would enable other species to be incorporated [a point of importance for the authors have limited themselves to important malaria vectors but the malariologist often wants to know the other species sufficiently well to exclude them].

The figures are line drawings and appear to be extremely good magnifications should be given. At the bottom of each plate are

brief notes (a dozen lines in all) on identification, adult habits, synonym, larval habitat, distribution and source of actual material on which the figure is based.

There is introductory information on the anatomy of adult and larva and methods of mounting. Compressed notes on field method could be acceptable.

Further parts dealing with the anophelines of the Old World are in preparation. P. A. Buxton

LEE, H. W. B., VITE, M. E. & HERBER, J. R. Inform. b.
 1. Anoph. h. l. dos. n. l. front. a. d. M. ex. co. v. Guat. mala.
 (1941). Certain Anopheles found on the Borders of Mexico and
 Guatemala. *R. I. t. Sal. b. dad. E. f. d. d. s. T. p. Mex. c.*
 1943. j. 4. N. 193-3 map. 11 f.

LENDAY, D. K. Guidance Notes on Pernicious Malaria. [Correspondence.] *T. r. Soc. Trop. Med. Hyg.* 1943. July. v. 37. No. 1. 63-4.

The author summarizes conclusions reached in dealing with pernicious malaria in unusual conditions. A valley noted for the malignancy of its fever, whose population had a hundred per cent spleen rate, suddenly became the temporary home of 30,000 non-immune workers of 7 different races. The annual fever incidence rate of these susceptible foreigners was 20 per cent and the type of malaria was unusually virulent. These notes on pernicious malaria as it occurred there were put together for the guidance of medical officers who came from time to time to help.

Pernicious malaria is an acute emergency in which even minutes may count. The four main types of pernicious malaria met with are: a) cerebral haemorrhagic and gastro-intestinal. In the a) type the patient is found cold, pulseless and often unconscious. Treatment must be immediate: hot water bottles, stimulant injections, on point of intravenous saline containing six grains of quinine hydrochloride. If open operation is needed a vein on the front of the ankle is recommended. The cerebral type of pernicious malaria was of two varieties: quiet and roiling. In the quiet variety the patient may be only drooping or in deep coma and usually has a temperature of 103° or 104° F. There is often incontinence of urine and faeces. Treatment: by lumbar puncture (partly to exclude meningococcal infection) and intravenous injection of quinine 6 grains in 10 cc. of water repeated every eight hours till drug can be obtained by mouth. In the roiling variety the patient may be restless, semi-conscious, with noisy breathing and frothing at the mouth or violent. The violent patient may be fighting mad, hard to catch and need a tight man to hold him down. Morphine indicated and chloroform may be needed before treatment can be given. These patients should be nursed on the floor. Lumbar puncture and intravenous quinine are indicated. In the violent patient mental stability may be regained in 6 to 12 hours. In the restless patient recovery is slower and fatal results are common. The haemorrhagic type of pernicious malaria may be characterized by epistaxis, rectal haemorrhage or petechial haemorrhages. Treatment is by intravenous quinine followed by antimalarial drugs by mouth. In the gastro-intestinal type there may be persistent vomiting, persistent hiccough, intestinal colic or choleraic symptoms. In this type also

intravenous quinine is indicated until drugs can be retained by mouth Morphia and chloroform are sometimes useful in hiccough cases

The microscope has little place in the diagnosis of pernicious malaria A negative blood slide has sent many to the grave Malaria may be responsible for some of the symptoms in cases of cerebrospinal meningitis or in cases of head injury In that valley every person brought in unconscious should be given intravenous quinine no matter what other treatment may be needed In cerebral cases quinine may be given intrathecally if lumbar puncture be done but the procedure does not appear to have any therapeutic advantages Quinine intramuscularly is absorbed more slowly than when given by mouth and has no place in the treatment of pernicious malaria except in young children Intramuscular quinine however was popular some 2 000 intramuscular injections were given in the market place only one abscess was recorded After being got under control malaria may show an inversion of temperature thus a patient who has had his fever at a stated hour may exhibit a decided drop in temperature at the same hour on the two days following the cessation of the attack The classical sweating stage of malaria with its attendant weakness may be due more to the treatment blunts during the shivering stage than to the disease itself In the treatment of malaria opium by mouth is useful but it is inferior to quinine

[It is to be hoped that the author will deal at greater length on some future occasion with his experiences in the valley where malaria is such a killing disease]

Norman White

TANGANYIKA TERRITORY MEDICAL DEPARTMENT Medical Pamphlet
No 37 (1912) (Replacing No 13 of 1930) 6 pp The Treatment of
Malaria

This pamphlet has been prepared for the information of medical practitioners in the Tanganyika Territory and summarizes recent trends in the specific treatment of malaria It contains nothing at variance with accepted practice Attention is called to the disadvantage of overtreating clinical malaria in partially immune persons such as compose the majority of the African population of the Territory 40 grains of quinine or totaquina are generally sufficient to clear up an attack of malaria in such people

Norman White

SEELER A O DUSENBERY E & MALANGA C The Comparative
Activity of Quinine Quinidine Cinchonine Cinchonidine and
Quinoidine against *Plasmodium lophurae* Infection of Pekin
Ducklings *J Pharm & Exper Therap* 1943 June v 78 No 2
159-63

The Malaria Commission League of Nation [this *Bulletin* 1932 v 29 461] recommended that totaquina should contain not less than 15 per cent quinine and at least 70 per cent of crystalline cinchona alkaloids The composition of totaquina is going to be re defined in a supplement to the U S P XII The mixture will then contain not less than 7 per cent or more than 12 per cent of anhydrous quinine and a total of not less than 70 per cent or more than 80 per cent of anhydrous crystalline cinchona alkaloids [see this *Bulletin* 1943 v 40 290] In view of the altered composition of totaquina the antimalarial activity

[December 1943]

of the four crystalline cinchona alkaloids and of two samples of totaquine and one of quinoidine has been determined in order to decide the effect of lowered quinine content. Their toxicity for mice was also investigated.

Numerous authors have reported on the activity of the above mentioned substances in canary malaria. In the present case tests were made against the schizonts of *P. lophi* in infections of ducks. Similar investigations of the action of drugs against this parasite have recently been made by WALKER and DICK [this Bulletin 1942 v 39 441] and by MARSHALL LITCHFIELD and WHITE [this Bulletin 1943 v 40 23]. Constant results are obtained if experimental conditions are uniform and the parasite responds to drugs which are effective in human malaria.

Peking ducklings about 50 gm in weight were used and the infected blood was inoculated intravenously. The drugs were administered in water daily by a stomach tube for the first six days after inoculation in amounts proportional to body weight. In the toxicity experiments a single dose was likewise administered to mice. The fact that little difference was found in antimalarial activity or toxicity of the four crystalline alkaloids under the conditions of test suggests that a mixture of alkaloids should prove satisfactory as an antimalarial. The following summary is given by the author —

- 1 Quinine quinidine cinchonine and cinchonidine show about the same activity against the schizonts of *P. lophi* in Pekin ducklings.
- 2 Quinoidine is considerably less active than the four crystalline cinchona alkaloids.
- 3 Two samples of totaquine varying widely in their quinine content were as active as quinine in duck malaria.
- 4 There is little difference in the acute oral toxicity for mice among the four crystalline alkaloids. Quinoidine is more toxic than the crystalline alkaloids.

TOMMASO P. Del grado di resistenza alla chinina di alcuni ceppi di *Plasmodium falciparum* [Resistance to Quinine of certain strains of *P. falciparum*] Boll. d. Soc. Ital. a. di M. d. e. Igiene Trop. (Sez. Entrea.) Asmara 1942 v 1 No 6 77-84 English summary

Notes are given of five cases of malaria four *P. falciparum* infections and one with a mixed *P. falciparum* and *P. vivax* infection all of which displayed an unusual resistance to quinine. All the infections had been contracted in the lowlands of Italian East Africa. The author put forward the hypothesis that in areas such as these where the sanitary level is low and the diet very deficient *P. falciparum* may exhibit a more marked tendency to develop in tissue cells than do European strains and thus be less exposed to the action of antimalarial drugs.

GLAZKO A. J. Estimation of Quinine in Urine including a Field Test for establishing the Estimation of Quinine in Malarial Prophylaxis U. S. War Med. Bull. 1943 Mar v 41 No 2 529-33 1 fig. [11 ref.]

A method of detecting quinine in urine using the double iodide of mercury (Hg_2I_2) as the precipitating agent is described. The double

iodide is prepared by adding an excess of mercury 30 gm to a solution of 22 gm of iodine and 30 gm of potassium iodide in 20 cc of distilled water. The mixture is shaken vigorously until most of the brown colour has disappeared and then while still yellow the solution is cooled under a running tap. When cool it should be a light green colour. It is diluted to 400 cc with distilled water and then decanted from the residual mercury. This solution will keep indefinitely. The sulphuric acid is made up to one part of the chemically pure acid in three parts of water. The combined reagent consists of equal volumes of the acid and double iodide solutions. This should be prepared fresh each day. To 5 cc of urine in a test tube 5 cc of the reagent are added. A milky opalescence indicates the presence of quinine or certain other cinchona alkaloids. Turbidity standards can be set up as an index of the quinine concentration. For field purposes a faint turbidity indicates that the man in question did not take his quinine the previous night. The presence of more than 5 mgm per cent albumin will give a flocculent precipitate with the reagent. The quinine iodo-mercurate dissolves on boiling the albumin precipitate remains unchanged.

The method may be used for the quantitative estimation of quinine in urine opalescence being measured with a photonephelometer. The technique is described in detail.

A number of experiments were carried out to determine the degree of turbidity that may be expected with urine collected at different intervals after the ingestion of quinine. A prophylactic dose of quinine taken at the evening meal gives a heavy turbidity with the reagent in urine collected the following morning. *Norman White*

YOUNG M D MCKENDON S B & SWARR R G The Selective Action of Thiobismol on Induced Malaria *J Amer Med Ass* 1943 June 19 v 122 No 8 492-4 1 chart

This is the record of an investigation to determine at what stage of development malaria parasites are affected by thiobismol and consequently the optimum time of administration and whether species of parasite other than *P. malar* are affected by the drug. Observations on 13 white patients undergoing malaria therapy with *P. malar* showed that a 0.1 or 0.2 gm dose of thiobismol had an inhibitory effect on half grown parasites i.e. on parasites 16 to 28 hours after the last paroxysm that they had caused. Parasites older and younger than this did not seem to be affected. Within four hours of the intramuscular administration of the drug fragmentary and irregularly staining parasites were seen as well as parasites free from red cells. By giving the drug 16 to 28 hours after a paroxysm that series of paroxysms was eliminated a quotidian periodicity was changed to tertian and usually remained so throughout the remainder of the infection and sometimes through several subinoculations. Observations on nine negroes undergoing *P. malariae* therapy yielded no consistent results. Usually the parasite density decreased for several days after administration of thiobismol but the drug had no clear cut action against any developmental stage of the quartan parasite. Thiobismol appeared to have no action at all on the parasites or fever of nine negroes undergoing malaria therapy with *P. falciparum*.

For the termination of *P. malar* infections an injection of thiobismol the day quinine is started subdues fever more promptly than does quinine alone. *Norman White*

RE ELI P T Military Malaria Control War Medicine Chicago
1934 June 3 No 6 563-84 [Refs in footnotes]

Practically the whole subject of malaria control is most ably condensed in this paper. The adjective military in the title of such a compilation is in a sense redundant: the principles of malaria prevention remain the same whatever population is at risk. The justification for its inclusion may perhaps be found in the somewhat greater attention paid to those sort of measures which the exigencies of military service in hyperendemic tropical countries may render most feasible. It is not possible to make a summary of such a vast amount of information nor is this necessary as much of that information is familiar. Attention may however be directed to a few points of particular interest.

Spraying adult mosquitoes is a measure that is discussed at length. Among the preparations issued by the Quartermaster's Department of the United States Army is Freon Pyrethrum Aerosol. This is a mixture of liquid freon 12 with 0.8 per cent wax free pyrethrins and 0.0 per cent sesame oil. Freon 12 is dichlorodifluoromethane: its vapour pressure produces the necessary spraying pressure which does not decrease as long as a single drop of liquid is present in the closed container. The mixture is issued in pressure cans or cylinder of 18 fluid ounces capacity. As the freon 12 contains the insecticide is sprayed it forms a fine mist from which the solvent evaporates almost immediately leaving the pyrethrum and sesame oil as a cloud of fine droplets. Freon 12 is not toxic either to man or mosquito and it is not inflammable. Fifteen ounces of the mixture are sufficient to spray 10,000 cubic feet and are liberated in from 12 to 14 minutes of continuous use. No direct hits on mosquitoes should be attempted: the waste spray. Freon pyrethrum aerosol should make a valuable contribution to malaria control in the field.

Early in the paper it is emphasized that malaria can be controlled effectively only by specially trained men working in a co-ordinated and supervised organization. This seemed tantamount to a confession that in many circumstances arising in war in hyperendemic areas nothing effective could be done. This pessimistic outlook is corrected later when the importance of instructing all ranks in regard to malaria and malaria control receives recognition. Measures are described for which the individual soldier should make himself responsible or in the carrying out of which he should give his intelligent cooperation: bed nets, protective clothing, sprays and repellents with the use of suppressive antimalarial drugs.

Norman H. H. H.

See also p 943 WAR MEDICINE Chicago Development of a Medical Service for Airline Operations in Africa

SOAP New York 1942 Nov 18 No 11 919, and 93 Insecticides for the Army The Aerosol Insecticide Programme and its Effects on the Insecticide Industry now and after the War

The Department of Agriculture, the Army and a few private companies have evolved a new type of self propelling insect spray for use principally against mosquitoes and flies by the Army in the tropics. This is the Freon bomb which looks like a small rounded drum. The standard army size is 5 inches long and 2½ inches in diameter with

siphon tube running down the middle of the inside and a nozzle and valve release almost flush with the surface of the top

The bomb contains pyrethrum concentrate dissolved in dichloromethane known commercially as Freon 12 and used in refrigerators. This substance (which is non toxic and non inflammable) has a low boiling point and is kept under a pressure of 85 lb to the square inch in the bomb. On opening the nozzle the insecticide is blown out and forms a fine fog or aerosol which is projected 6-8 feet from the nozzle. From that point it floats about like smoke.

It is estimated that the aerosol cloud from one bomb is sufficient to kill all flies and mosquitoes in 100 000 cubic feet.

The pyrethrum used is 20 per cent concentrate and it is dissolved to give 4 mgm pyrethrins per gm of solution. It must be carefully filtered to remove all materials which might clog the jet. Refined sesame oils added at 10 mgm per gm solution to increase the insecticidal effect. One bomb contains the equivalent of 1 lb of pyrethrum flowers.

The bomb is filled by evacuating with a water pump admitting the required amounts of pyrethrum concentrate and sesame oil and then connecting to the Freon supply. By heating the latter or by cooling the bomb the liquid can be run into the bomb. A small amount of the bomb like substance in the pyrethrum extract is not soluble in the Freon but this adheres to the side of the bomb and causes no difficulty.

The bomb appears to be safe simple and effective for use in the tropics. It seems especially suitable for killing mosquitoes in aircraft. Its disadvantages are (i) The container must be returned to base for refilling or be discarded (ii) Irresponsible operators are tempted to waste pyrethrum by over use.

J R Busvine

MAXWELL R D & HATHWAY A E The Duck as a Host for the Avian Malaria. *Amer J Hyg* 1943 Mar 37 No 2 153-5

WOLFSÖN has shown that the duck is susceptible to four species of bird malarial parasite—*P. cathemerium*, *P. relictum*, *P. elongatum* and *P. lophurae*. With a view to discovering if ducks are susceptible to other bird malarial parasites the experiments recorded in this paper were carried out. It was found that the duck could be infected with *P. nucleophilum*, *P. relictum* var *matutinum* and *P. circumflexum* but not with *P. hexamerium*, *P. oli*, *P. rouxi*, *P. langhami* or three strains of *P. cathemerium*. As regards *P. lophurae* now employed extensively in white Peking ducks for chemotherapeutic work it was found that the Mallard duck, the Muscovy duck and the common turkey were very susceptible. Pigeons developed only a light infection but canaries were infected without difficulty.

C M Henyon

BLACKWATER FEVER

FOY H & KONDI Athena Lyso Lecithin Fragility in Blackwater Fever and Haemolytic Jaundice. *Trans Roy Soc Trop Med & Hyg* 1943 July 37 No 1 1-18 7 charts [62 refs]

Erythrocytes from cases of blackwater fever show an increased fragility to lyso lecithin but normal erythrocytes transfused into a

patient suffering from blackwater fever are destroyed as readily as the patient's own cells. The cells in blackwater fever therefore possess some abnormal feature but it may be due to changes in their environment. Spherocytosis occurs and is accompanied by decreases in erythrocyte diameter, thickness, ratios, volumes and areas, the value being intermediate between those of haemolytic jaundice and the normal. It may be that the initial stage in the destruction of the cell is a change in permeability of cell membrane which allows haemoglobin to escape. The cells later become swollen, transparent and finally disappear but are not broken up for some time because on resuspending in saline the ghosts reappear. This phenomenon occurs both in lyso-lecithin and in snake venom haemolysis. If the process be allowed to continue the cells are finally disrupted and will not reappear on saline resuspension. In haemolytic jaundice there may be some defect in the erythrocyte as well as a splenic factor because splenectomy fails to alter the abnormal fragility of the cells although it may stop the periodic haemolysis. It has been suggested that haemolysis in many haemolytic conditions may be due to the production of lyso-lecithin following stagnation and separation of cells and plasma in the enlarged spleen. It is possible that lyso-lecithin fragility is related to the action of this substance on the lipoids or lipo-protein complex in the red cell membrane. The amount of lipoid in the cell envelope is related to the dimensions of the cell and the ability of the cell to increase its volume without rupture is related to the lipo-protein ratio in its membrane. Lyso-lecithin haemolysis may be due to an enzyme lecithinase acting on a substrate of red cells or plasma lecithin to produce lyso-lecithin or some allied phosphatide. Lecithinases have been shown to be present in many conditions where haemolytic reactions occur, e.g. in favism, snake poison, and in *Cl. welchii* filtrates as well as in the spleen and peripheral blood. There are various lecithinases and the degradation products of the reactions on lecithin are not always the same. Snake venom lecithinase acting on lecithin produces lyso-lecithin but the latter injected into baboons in relatively huge amounts produces no haemolysis and only a slight increase in cell diameter which is in sharp contrast to the haemolytic reaction which follows injection of the venom. This difference may be due to the fact that in the former case the lecithin in the cell and plasma is not disturbed whereas in the latter procedure the lecithinase will split the lecithin of the cell and plasma and so disturb the intra-cellular lipo-protein complex. There is some evidence to suggest the macrophages of the spleen elaborate a proteolytic enzyme capable of destroying both red and white cells and that the production of this enzyme runs parallel with blood cell phagocytosis. The part played by the reticulo-endothelial system in haemolysis, however, is not clear and quantitative studies to fix the precise proportion of red cells destroyed by this system are lacking. Even when grossly hypertrophied it seems unlikely that it can account for the sudden cell destruction that occurs in the condition under consideration.

F. MURRAY

NELSON, A. J. M. Blackwater Fever. Review of a Case. *Med. J. Aust.* 1943, May 29, 1, 22-491, 3, 1 fig.

This is a description of a severe attack of blackwater fever in an Australian soldier serving in Papua. From March to November 1941 he had lived in an isolated part of the country where there was no medical

officer He took quinine 5 grains daily until his first attack of fever in May after which he took 10 grains of quinine daily He treated himself for this attack by remaining in bed and taking 30 grains of quinine daily for three days During the following months he had about five attacks of fever but was able to keep at work He was transferred to the Moresby area at the beginning of November On November 6th he felt feverish and took a large dose of quinine Blackwater fever developed next day and on November 8th he was admitted to hospital The attack lasted for seven days with a short remission on the 4th day The erythrocyte count fell from 2 500 000 per cmm on the day of admission to 1 500 000 on the 6th day in hospital He was able to drink well and passed large amounts of brownish black urine It was noted that on admission there was exquisite tenderness in both loins and in the lower part of the abdomen the spleen was palpable four fingers breadth below the ribs and the liver was enlarged and tender Thick blood films showed scanty subtertian rings He was given alkalis by mouth and the urine soon became alkaline Atebrin 0.1 gm thrice daily and later 0.6 gm daily was also given by mouth Blood transfusions were given on the 2nd 3rd 5th 6th 7th and 8th days amounting altogether to 5½ litres Anahaemin (liver extract) was given intramuscularly on the 7th and 9th days He began to recover on the 8th day and was well and active by the 12th day He returned to Australia and reported that he had remained well J F Corson

TRYPANOSOMIASIS

MACALLAN J W A Tsetse Fly and Trypanosomiasis Survey in Bechuanaland 1940-1942 68 pp 2 maps (1 folding) & 60 figs [38 refs] 1942 [? Mafeking] [Summary taken from *Rev Applied Entom Ser B* 1943 Aug v 31 Pt 8 147-8]

As a result of the discovery of four cases of sleeping sickness in 1938 in Ngamiland Bechuanaland Protectorate where trypanosomiasis of stock is frequent and *Glossina* is reoccupying territory that it lost in the rinderpest outbreak towards the end of the last century it was decided to make a sleeping sickness survey of the human population and a tsetse fly and trypanosomiasis survey of the country and stock This report deals in detail with the latter survey which was made between 1st July 1940 and 31st December 1941 The history of trypanosomiasis in Ngamiland is very briefly reviewed an account is given of the procedure followed in the survey and the physical characters of the country and the vegetation population and game are described *G. morsitans* Westw was the only species of *Glossina* found and *Trypanosoma congolense* is the only animal trypanosome present There are 112 403 head of cattle in Ngamiland of which 45 272 are in threatened areas Trypanosomiasis occurs frequently in cattle only rarely in horses probably because they are herded with greater care and very occasionally in goats and donkeys which are normally kept on or just within the fringe of the fly belt Sheep are not usually grazed on any threatened area A scheme for the economic organisation of trypanosomiasis control is suggested It consists in the compulsory

sale of clinically infected stock to a treatment centre for a price greater than the value of the herd and subsequent treatment and marketing. The report of mechanical transmission in areas free from *Glossina* was confirmed in 1940.

The account of the survey and discussion upon it include much local detail. Catches of *G. morsitans* were always highest where vegetation was thickest and nearly always higher in thicket with canopy than any other type of vegetation. Breeding took place in the densest forest fringes on account of the danger of desiccation in the open where semi-arid conditions prevail. Pupae were not concentrated. Careful study of aerial photographs was found to assist in the location of breeding sites. Destruction of these by cutting small trees and low branches and burning when they were dry was undertaken as routine work in the area. Subsequent catches showed that clearing made considerable difference to the immediate neighbourhood quite unsuitable for the fly in one area but the result in the other was confused. Their possible influence is discussed. The fly population did not appear in the period of the survey to be related to rainfall or to maximum minimum or mean temperature. The flies were more attracted by a screen bait consisting of a blanket suspended from a pole at shoulder height than by donkey and tillage bait alone. Catches in a new collapsible trap of the same design and gauze previously used in East Africa were very disappointing and apparently not influenced by position but the number taken were too small to be significant. A trap similar in shape to the Harris trap but smaller also failed. No flies were taken in traps during the dry season when trapping appears to be useless. Harris traps caught very well when there were men in the vicinity but not at all otherwise.

In the discussion and conclusions it is stated that humidity from swamps and the vegetative lines to swamp channels provide the necessary help for the fly and game becoming more and more abundant. Advance into new areas is the result of population pressure and requires the availability of shelter and food in the form of game, domestic stock or fallow. These must be permanent. For advance to be permanent there must also be suitable breeding sites providing soil with a certain amount of humus and shelter from direct sun, wind and flood. Advance

halted by natural barriers consisting of areas that cannot support game or that lack shelter or in which game cannot be easily located or by artificial barriers consisting of areas that have been invaded by fire or inhabited areas in which shelter and game are reduced. Local examples of the operation of the limiting factors are given and

danger areas into which the advance of the fly is considered possible unless the balance of factors is changed are discussed. These include Maun the capital. The situation in the Chobe Fly Belt some 20 miles to the north where there are 9,000 head of cattle is briefly discussed. In the course of five visits *C. morsitans* was the only species found. It is possible but not proved that the two belts are confluent.

Government will be required to bring the Ngamiland natives to support control actively and the administrative problems are discussed. Recommended measures include the selection of grazing grounds to be maintained, the settling of families along the edge of all danger areas, the erection of fences of thorn bush against game thicket, control the position of traps, the adoption of the scheme for compulsory treatment of infected stock, the control of game and certain clearing work details of which are given. No area should be allowed

to be a game reserve. References to *Glossina* in Ngamiland in works published between 1850 and 1917 are reviewed.

Since the conclusion of the sleeping sickness survey there has been a serious recrudescence in one area. A few notes on the occurrence of the disease and its dispersal are included and the recommendations made by I. W. Mackichan in the report on the 1939-40 sleeping sickness survey are given. They are that a sleeping sickness patrol should be established, the inhabitants of certain villages transferred to tsetse free areas and return to the old villages or the erection of new ones in the fly belt prohibited and bush clearing in a specified area carried out.

Finally it is suggested that Ngamiland could be surrounded by a cattle free desert zone, all the cattle in Ngamiland and Chobe inoculated against rinderpest and the disease then introduced among the large ungulates in the swamp area to reduce the food supply of the tsetse.

BRAZZAVILLE [AFRIQUE FRANÇAISE LIBRE] RAPPORT SUR LE FONCTIONNEMENT TECHNIQUE DE L'INSTITUT PASTEUR EN 1941 [CECCALDI J. Director 59-73 Contribution à l'étude de la reinfection en trypanosomiase humaine [Reinfection in Human Trypanosomiasis]

The African native often shows a surprising tolerance for human trypanosomes. A considerable number of people apparently in perfect health are found to be infected with trypanosomes on the occasion of a visit to the Pasteur Institute to obtain a health passport. In certain sleeping sickness patients the nervous stage does not develop for a very long time, sometimes years. In some cases also the disease may show periods of latency or silence lasting for years.

Notes are given of three patients who were treated and apparently cured, remaining well and showing no signs of infection on repeated examination during several years and again found to be infected when examined in 1940-1941. Examinations were made two or three times a year by triple centrifugation of the blood and by lumbar puncture.

The first case was diagnosed and treated in 1929 and examined two or three times a year during 1930-1933 and then not seen again until 1941 when trypanosomes were found in his blood. The other two cases were diagnosed in 1932, treated and apparently cured. One was not seen after 1934 until December 1940 when trypanosomes were found in her blood; the other was not seen between June 1935 and May 1941 when the blood was negative by triple centrifugation but the cerebrospinal fluid showed trypanosomes, 588 cells per cmm and 0.66 per cent protein.

The question of persisting chronic or inapparent infection or of reinfection is discussed but no conclusion is arrived at. J. T. Carson.

LEWIS E. A. WILEY A. J. & MACAULAY J. W. The Transmission of *Trypanosoma congolense* by *Glossina austeni*. *Ann. Trop. Med. & Parasit.* 1943 Sept 7th v. 37 No. 2 98-107 10 charts.

Pupae of *Glossina austeni* were collected near Kilifi in the Kenya coastal district and the flies were bred out at the Veterinary Research Laboratory, Kabete near Nairobi. Transmission experiments with *Trypanosoma congolense* were made there. The strain of *T. congolense* was obtained from a naturally infected ox at Thika which is about 30 miles from Nairobi. Transmissions of *T. congolense* were made by

G. austini and by inoculation of blood to various animals including oven sheep goats pigs mules and a dog and a buffalo and an oryx. Observations were made of the incubation period and course of the disease by recording the body temperature and by microscopical examination of the blood. The infection was rapidly fatal to cattle rabbits mules and the dog but was more chronic in sheep goats pigs and the oryx. The buffalo which was infected by *G. austini* died on the 28th day but its death could not be attributed entirely to the trypanosome infection. The incubation period varied from about one to three weeks occasionally longer.

Dissection of 1 of the flies showed infection in two the labrum contained dense colonies of the parasites and the hypopharynx was heavily infested.

The authors conclude that it is reasonable to regard *G. austini* as a natural vector of *T. cruzi* and that additional experiments with wild flies are needed.

J. F. Corson

MAZZA S. & CHACON R. V. Primeros animales domesticos y seres humanos con *Sch. of. ypanium cruzi* comprobados en Bolivia. [First Cases of *T. cruzi* Infection in Man and Domestic Animals of Bolivia.] Reprinted from *Prensa Med. Argentina* 1943 Mar 3 30 No 3 6 pp 2 figs.

Though infected Triatomid bugs have been known to occur in Bolivia for a long time this was the only country in South America from which no human or other mammalian cases of infection with *Trypanosoma* had so far been recorded. In the present paper the authors report such cases for the first time. Working in different parts of Bolivia and at various altitudes they have examined thick blood films taken from 61 children 15 pups and 4 kittens. Of these one child and one pup proved to be infected with the trypanosome. The authors further found a high degree of infection among Triatomid bugs (from 12 to 50 per cent of those examined) caught in human dwellings. Inoculation of the faeces of these insects into white mice produced heavy infections. From these facts it is concluded that not only does Chagas's disease exist in Bolivia but its distribution in the country must be fairly wide.

C. A. Hoare

GASTIC G. Algunos hechos sobre clinica y epidemiologia de la enfermedad de Chagas en Chile. [Facts regarding Chagas's Disease in Chile. *Bol. Ofici. a Sal. Publica Pa. americana* 1943 Apr 1 27 No 4 37-35 [14 refs.]

The study of Chagas's disease in Chile may be said to have started in 1937 when the Health Department set up a sub-department of Parasitology. The first acute case of the disease was recorded in 1938. Generally speaking the disease appears to be of a milder type in Chile than in the Argentine Brazil and Uruguay and it is probable may estimate that many have passed unobserved acute cases being exceptional and many of the more chronic being discovered by use of the Machado test on random persons among the population.

The author analyses 69 cases of which 16 were acute 48 subacute and 5 chronic. Of the acute 9 were children and 7 adults 14 had palpebral oedema on one side two had generalized oedema secondary to

the palpebral cardia enlarged liver and spleen and generalized secondary glandular swelling. Two died with nervous and cardiac complications the rest were relatively benign in course. The cardiac disturbances comprised changes in rate and rhythm mostly of sinus origin. In 10 cases the trypanosome was found in the blood in six proof was obtained by xenodiagnosis.

Subacute cases were characterized by tachycardia enlargement of liver spleen and glands and febricula or isolated bouts of fever. The age distribution was 1-5 years six cases 6-10 years twenty one 11-20 years eleven 21-30 years six 31-40 years four. All were proved by xenodiagnostic methods with puppies. The Machado-Guerreiro reaction was tried in 17 and proved positive in 15 negative in two. The five chronic patients were all between 29 and 60 years of age and all had cardiac arrhythmia.

The lower virulence of the disease in Chile is ascribed to the facts of immigration being less than in the countries bordering the Atlantic and secondly of the disease being of longer standing in the western parts of America and the people being more resistant to the trypanosome [a lame explanation if not mere tautology].

Three species of *Triatomidae* occur in Chile *T. infestans* *T. spinolae* and *Triatomapera porteri* but only the first seems to be really important as a vector. Forty per cent of over 9 000 examined were found infected. As for reservoir hosts dogs and cats are certainly such. 20.4 per cent of 184 of the former and 4.4 per cent of 136 of the latter were positive. Other animals among them the llama bat fox pig and a small rodent *Octodon degu* have all been negative to examination.

The geographical distribution in Chile extends from the Province of Tarapaca to that of Curicó and the majority of cases are found in Atacama and Santiago. It is quite common to find more than one member of a family infected. As regards age the acute cases occurred equally in children and adults the subacute more in children and the chronic in adults. In studying the epidemiology 1 445 Machado reactions were tried on inhabitants of the rural districts and 31.8 per cent were positive.

H. Harold Scott

FALCAO J de B. Caso agudo de tripanosomose americana observado em Santo Angelo das Missões Rio Grande do Sul [An Acute Case of Chagas's Disease in Santo Angelo das Missões Rio Grande do Sul] *Brasil Medico* 1943 Apr 3-10 v 57 Nos 14-15 179-82

The author records the case of a girl of three years brought to him on account of a swollen eye. There was painless palpebral oedema of the left eye with erythema and mild conjunctivitis. The preauricular glands were enlarged on both sides. The case was quite straightforward and the diagnosis clear by the presence of *T. cruzi* in the blood smear and was confirmed by xenodiagnostic methods. The course of the illness seems to have been satisfactory but nothing is said concerning the treatment adopted.

SIVOES and TUPINAMBÁ had observed 24 cases in a few months (reported in 1942) 13 adults and 11 children among 78 persons examined—a high proportion which was confirmed by xenodiagnosis. They also found two out of 13 dogs one of 7 cats and one of 11 armadillos positive. A few *Triatomas* *T. infestans* captured in the residence

peptone and dextrose in proportions given above. The tubes are inoculated with 0.5 cc to 1 cc of a culture of *T. cruzi* and kept at 25-28 C for 10 days.

The broth containing the organisms is drawn off and centrifuged rapidly after which the trypanosomes are washed three times with saline. Finally the material is washed and centrifuged in a 15 cc graduated tube with saline containing merthiolate (1:10,000). The volume of packed material is measured, the supernatant fluid poured off and nine volumes of the saline merthiolate mixture added. About 0.5 cc packed trypanosomes are obtained from 20 culture tubes.

The suspension is frozen in dry ice and methyl cellosolve and allowed to thaw slowly, the process being repeated three times. The antigen is then ready for titration and is kept at -4-6 C.

It has been tested successfully with the sera of experimentally infected animals and of nine human cases of Chagas's disease in which complement fixation was positive in dilutions from 1:160 to 1:10. The antigen retained its stability for many months. C. A. Hoare

MAZZOTTI I. Estudios sobre *Triatoma hegneri*. I. Infeccion natural y experimental con *Trypanosoma cruzi*. II. Intentos de cruzamiento con *T. dimidiata* [*Triatoma hegneri*. I. Natural and Experimental Infection with *T. cruzi*.] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico 1943 Mar v 4 No 1 53-6 1 fig. English summary (4 lines)

1. *Triatoma hegneri* Mazzotti 1940 was found infected in nature with *Trypanosoma cruzi*. Experimental infection was also demonstrated.

2. Experimental crossing between *T. hegneri* and *T. dimidiata* gave production to unfertile eggs.

IRIARTE D. R. Infestacion experimental por *S. cruzi* del *Triatomacapitata* Usinger 1939 [Experimental Infection of *T. capitata* with *T. cruzi*.] *Bol. Laboratorio Clinica Luis R. Veliz* Caracas 1943 May v 3 No 10 179-80 1 fig.

CALDWELL T. E. & GYORGY P. Effect of Biotin Deficiency on Duration of Infection with *Trypanosoma lewisi* in the Rat. *Proc. Soc. Exp. Biol. & Med.* 1943 June v 53 No 2 116-19.

Summary.—Biotin deficiency has been found to prolong the infection with *T. lewisi* in the rat. This effect can be negated by the administration of biotin to the deficient rat during the course of infection. Biotin appears to be instrumental directly or indirectly in the activation of the immune bodies in this infection.

LEISHMANIASIS

POTENZA L. & ANDRZEJ P. J. Kala Azar en el estado Bolivar Venezuela [Kala Azar in the State of Bolivar Venezuela.] *Rev. Policlínica* Caracas 1942 Nov-Dec v 11 No 67 312-17.

Kala azar was first discovered in S. America by MIGNONE who described a case in an Italian who had resided in Paraguay for some

years [see the *Bulletin* 1913 v. 1 630]. Since then cases have been recorded from the Argentine, Brazil and Bolivia. In Venezuela with which the paper is chiefly concerned the first case was recorded by POY and MARTINEZ in the state Guarico in 1941 [this *Bulletin* 1942 v. 39 607]. This led to a survey which included the examination of 847 specimens of liver removed by viscerothomy. In one of these from a child 1½ years of age in the state of Bolivar leishmaniasis were discovered. Attempts to correlate these cases with the presence of *Phlebotomus* were not successful for though the insects occurred in certain localities in some of which there was evidence of the existence of cutaneous leishmaniasis they could not be found in the district in which the two cases of kala-azar had been discovered. The authors admit however that further investigations are required before any conclusions can be drawn from these negative results.

C. M. Henson

LAFFLEUR M. & GODARD G. A propos d deux cas de kala-azar infantile. [Two Cases of Infantile Kala Azar.] *Arch. Inst. Pasteur Algerie* 1942 Mar. v. 20 No. 1 33-8 2 pls.

The paper describes two cases of kala-azar in young children in the province of Constantine, Algeria. In both cases malaria had been regarded as the cause of the illness but failure of response to antimalarial treatment led to further examinations. In the one case splenic puncture revealed leishmaniasis while in the second case the parasite was discovered in large numbers in a film of the peripheral blood along with the parasite of benign tertian malaria. The first patient responded rapidly to intravenous neostibosan while the second was rapidly cured by this drug combined with quinine. It is pointed out that tell neostibosan was administered to the second patient for treatment of the leishmaniasis infection quinine had failed to influence the malaria.

C. M. Henson

FEVERS OF THE TYPHUS GROUP

CIVIANI O. V. Studio sull'andamento della febbre ricorrente e del d mottito in Asmara nel quadriennio 1939-1942. [On the Prevalence of Relapsing Fever and Typhus in Asmara in the Period 1939-1942.] *Boll. d. Soc. Italiana di Med. e Igiene Trop. (ex-Eritrea)* Asmara 1943 2 No. 3 85-93. English summary (5 lines).

The climate of the upper levels of Eritrea resembles that of many European cities but the region is the site of diseases which militate against successful colonization especially in the more thickly populated districts. The author has studied the question of the prevalence of two of the more important of these diseases viz typhus and relapsing fever during the four years 1939-1942 inclusive. The diagnoses have been confirmed by the Weil-Felix reaction in the former and by the prohaetic reaction in the latter. Analysing the return and 10 per cent for Italians and for the natives during the four years 7.6 and sterile have been 141 European cases of typhus and 106 and 105 in February and March after solidification and 83 and 97 natives the lowest was 35 (9 E) containing proteose

November Of relapsing fever there have been 52 European and 651 native cases In no month did the European total reach double figures during the whole four years The greatest number of native cases was 109 in September the next being 73 in August and 67 in October Both diseases are to be regarded as endemic in Asmara and for both the vector is the louse and the crowding together of natives in the wet and cooler months facilitates the spread of infection The fact that more Europeans are attacked by typhus than by relapsing fever is peculiar and the explanation offered is not very satisfactory that the non medical man mistakes an attack of relapsing fever for a relapsing malaria and so does not attend for treatment *H Harold Scott*

POTAPCHIK J A A Contribution to the Detection of the Spotted Fever Virus in the Reconvalescents *Arch Sci Biol Moscow* 1940 v 58 No 2 [In Russian 58-67 3 charts (11 refs) English summary 67]

In view of the existing controversy regarding the presence of the causative organism in convalescent cases of typhus fever 54 patients who had recovered from the disease and showed a positive Weil Felix reaction were tested during periods of convalescence varying from 1 to 18 months by experimental infection of 89 guinea-pigs Of these 57 were inoculated with the blood of the patients 2 with the teased up guts of lice fed on the patients and 30 with brain emulsion from passage animals

The results of examination of these animals were inconclusive for in no case was it possible to reproduce a typical experimental infection with typhus fever However three strains could be interpreted as being positive but atypical since they showed only some of the characteristic symptoms while the others were absent Moreover these strains were not readily passaged It is concluded that convalescent cases do not play an important role in the epidemiology of typhus fever

The author also notes that the Weil Felix reaction may remain positive during convalescence for periods up to 39 months with a titre of 1 200 *C 4 Hoare*

BENHAMOU E Les rickettsia du typhus exanthématique et de la fièvre boutonneuse dans les cellules endothéliales de la moelle osseuse [The Rickettsiae of Exanthematic Typhus and Boutonneuse Fever in the Endothelial Cells of the Bone Marrow] *Arch Inst Pasteur d'Algérie* 1942 Dec v 20 No 4 309-13

Smears of bone marrow obtained by sternal puncture from typhus patients show the following cytological changes —(1) A great increase in the number of endothelial cells (2) A still greater increase in the plasmocytes (3) Numerous lymphocytes 10 to 20 per cent instead of the normal 3 to 5 per cent (4) A fair number of megakaryocytes 2 to 3 per cent instead of 1 per cent The percentages of the myelocytes polynuclears and erythroblasts were correspondingly reduced

The endothelial cells have been wrongly included as monocytes by some workers
 They were found in the endothelial cells in the following
 [Kala Azar] One or more morula like masses which tend to be larger
 [Kala Azar] One is present in the cell They are brighter red than the
 [Kala Azar] They have a characteristic granular appearance (2) Punctate
 like those originally described by RICKETTS (3) Large
 described as morulae

homogeneous masses one in each cell corresponding to the initial bodies of trachoma these have been found in only one case up to the time of writing.

These three forms correspond generally to the types recently described by GIROUD and LANTIER in the lung cells of infected rabbits and suggest stages in the evolution of the Rickettsiae from isolated granular bodies to agglomerations of various types.

In both cases the findings are of the same general type but with minor differences such as the presence of numerous eosinophilic leucocytes the tendency of some of the endothelial cells to undergo lysis and the presence of these cells of small rounded rose red granular nature.

The author claims that the search for Rickettsiae in sternal puncture fluid will enable an early diagnosis to be made in both diseases and probably also in other Rickettsial diseases. *John H. D. Meade*

GALLAFÉ I. P. Blocage du système réticulo-endothélial et lésion tissulaire par le virus du typhus exanthématique [Blocking of the Reticulo Endothelial System and Infection by the Virus of Typhus Exanthematicus] *Arch Inst Pasteur d'Algérie* 1942 D 20 No 4 31-21

The reticulo-endothelial system of several guineapigs was intensively blocked by intraperitoneal and subcutaneous injections of 1 per cent solution of trypan blue. These animals reacted to intraperitoneal injection of *Rickettsia prowazekii* in exactly the same way as control guineapigs. *John H. D. Meade*

RENOUX G. Réaction allergique chez l'homme dans le typhus exanthématique [Allergic Reaction in Exanthematic Typhus] *Arch Inst Pasteur d'Algérie* 1942 Dec 1 20 No 4 314-16

The occurrence of allergic reaction after the intradermal injection of typhus Rickettsiae into guineapigs recovered from typhus fever has already been recorded by CASTANEDA and later GIROUD made a similar observation in human beings.

In the present investigation 0.1 cc formalized rabbit lung vaccine was injected into the dermis of one forearm and formalized suspension of the lung of a healthy rabbit was injected into the other arm as a control. An immediate temporary reaction resulted in every case probably due to the formalin. In positive reactions the reading was made after 48 hours and the appearance resembled that of the intradermal tuberculin reaction. The criterion of a positive reaction was the occurrence of a central palpable nodule and zone of necrosis surrounded by an erythematous zone ranging from 1.5 to 6 cm in diameter according to the intensity of the reaction.

Of 25 persons tested two to three weeks after desquescence 23 were positive in degrees which corresponded generally with the severity of the attack. The attacks had been very mild in the two negative persons.

Of 41 sailors who were tested seven gave positive results and all of these had served in Africa for 7 to 10 years; they were also shown by Giroud's serum protection test to be immune.

The results of the test were compared with those of the Giroud test in 94 persons who had received the last dose of a protective vaccine a month previously. They agreed in all but three cases in one of which the intradermal reaction was positive and the Giroud test negative in

the other two there was a very doubtful intradermal reaction and the Giroud test was positive

John W D Megaw

GILDEMEISTER E & PETER H Fleckfieberstudien III Mitteilung Ueber das Vorkommen und den Nachweis der *Rickettsia prowazekii* im bebruteten und infizierten Huhnerei [The Site of Occurrence and the Demonstration of *Rickettsia prowazekii* in Infected Embryo Chicks] *Zent f Bakt* 1 Abt Orig 1943 Jan 20 v 149 No 7/8 425-8 2 figs

Cox has described the Rickettsiae as being specially abundant in the yolk sac of the infected chick embryo and as being scanty in the chorio allantoic membrane embryo and yolk This finding is confirmed

The structure of the yolk sac is described In sections of the yolk sac the Rickettsiae are found in enormous numbers in the loose endodermal tissue none are seen in the ectodermal tissue or in the endothelial cells of the blood vessels of the sac

By the method of fluorescence microscopy described by PASS (1942) the Rickettsiae are specially well demonstrated The method is not suitable for smear preparations because the yolk globules are highly fluorescent and so cause interference Thin paraffin sections give the best results

For yolk sac smear preparations Castañeda's method of staining is recommended it gives as good results as Machavello's method and is more convenient

The Rickettsiae are remarkably pleomorphic small coccoid forms rods and threads may occur in the same smear sometimes one or other of these forms predominates

John W D Megaw

VAN ROOYEN C E & BEARCROFT W G C Typhus Rickettsial Agglutination Tests in the Middle East Forces and Egypt *Edinburgh Med J* 1943 May v 50 No 5 257-72 [41 refs]

In the important investigation described in this paper the authors have had the benefit of the help and advice of Col J S K BOYD whose work on the serology of the fevers of the typhus group is well known

In a large series of cases of epidemic louse borne and murine flea borne typhus the agglutination responses to three types of *Proteus* and two types of *Rickettsia* organisms have been determined

The chief findings have been summarized by the reviewer from the data contained in the paper

The places of origin and types of the disease were as follows —

	Epidemic Typhus	Murine Typhus
Egyptian civilian patients from Cairo and Tanta hospitals (March to June 1943)	17	4
British and Allied troops stationed in—		
Iraq	6	1
Palestine and Syria	0	7
Cairo and Alexandria	6	3
Canal zone and other areas in the Middle East	4	23

This paper has been reprinted at pp 433-5 of the July 1943 issue of the *American Journal of Tropical Medicine* with the footnotes renumbered for greater clarity.

John W D Meade

STEELE W Ueber einfache Trocknung von Testbakterien für Agglutinationstests [Simple Methods of drying Bacterial Cultures for Agglutination Tests] *Ztschr f Immunitätsf u Exper Th* 1943 Apr 20 103 No 1 26-34

The author makes no claim for originality in the principles involved in the method described. He points out that WILSON was the first to use bacterial cultures dried in a desiccator for agglutination work.

The bacteria that can be dried without sacrifice of their agglutinating power are *Shigella* and the dysentery bacilli of the Shiga toxin and Flexner types. The organisms of the enteric group are not so suitable because their H agglutinins are destroyed in the process of drying. Slope agar cultures of 24 hours growth were used in all the methods.

One method was to wash off the culture with normal saline centrifuge the suspension and the precipitate with equal parts of acetone and normal saline then allow the mixture to dry with occasional shaking at room temperature in the incubator. The resulting powder is sterile, is mixed with normal saline and filtered through filter paper just before being used. Powders kept at room temperature for a year were found to have lost little or none of their agglutinating ability.

The simple method of all was to pick up the culture with a loop which is also used to rub the growth on the surface of strips of firm smooth filter paper 1 by 8 cm and folded ten times. The rubbing is continued till the surface loses its moist shiny appearance and becomes matt dry and yellowish in colour. The treated papers are kept in sterile containers and can be used any time after a few days up to three months. A better method is to wash off the culture with normal saline centrifuge the suspension two or three times at 3000 revolutions every half hour remove the supernatant fluid thoroughly and smear the precipitate on the filter paper which is dried thoroughly and then sealed in sterile sealed test tubes or wrapped in envelopes made of a high grade of Cellophane. The envelopes can be sealed with a water glass preparation. By adding 0.2 per cent formal to the saline the organisms can be obtained in the killed condition.

To prepare a suspension for test purposes the strips are immersed in normal saline in a test tube after occasional gentle shaking for five to ten minutes the bacteria float off.

With these paper agglutination tests can be carried out in the most primitive conditions. For example a drop of water can be added to a drop of fresh or dried blood on a glass slide a small piece of the test paper floated on the preparation and kept moving by the point of a needle. In positive cases the reaction is visible within a few minutes. The reaction is easier to observe if the strips are stained with alkaline methylene blue and thoroughly dried before being smeared with the bacteria. When stained strips are used the test can be made with a drop of fresh fine blood even without the addition of water.

The stained strips are peculiarly suitable for the dry blood agglutination test of KUDICKE and STEUER but they can be used with advantage in all the tests for which bacteria-coated papers are employed.

John W D Meade

GRUBMULIER J Neuritis nach Fleckfieber [Neuritis in Typhus Fever] *Ztschr f d gesamte Neurol u Psychiatrie* 1943 Mar 10 v 175 No 3 403-8 8 figs

Six cases of localized neuritis in German soldiers suffering from typhus fever are described. There were varying degrees of muscular wasting, paralysis and sensory disturbances. The nerves specially affected were respectively (1) both ulnars (2) left ulnar (3) left upper brachial plexus and right ulnar (4) both upper brachial plexuses (5) left median (6) right ulnar. In the sixth case there was also some tenderness on pressure over the sciatic nerves.

Similar forms of neuritis probably also of toxic origin occur in typhoid fever but the author does not mention the possibility that pressure resulting from decubitus may be an important factor.

The onset was early in the course of the fever in three cases; in the others the condition was not detected till the temperature had fallen.

An interesting comment is that all the soldiers belonging to the same group as one of the patients were attacked by typhus.

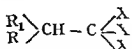
John W D Macfarlane

SOAP New York 1943 July 19 No 7 101 103 & 105 Army Louse Powder and other Insecticidal Possibilities of Diphenyl Trichloroethane from which it is being manufactured.

Dichlor diphenyl trichloroethane $\text{Cl} \text{---} \text{C}_6\text{H}_4 \text{---} \text{CH}(\text{Cl}) \text{---} \text{C}_6\text{H}_4 \text{---} \text{Cl}$ is the active

ingredient of the new U.S. Army louse powder. It is much more effective than the old formula which was not satisfactory under tropical conditions. [The old preparation contained pyrethrum, isobutyl undecyleneamide and dinitroanisole].

The new synthetic is highly effective for other insects besides lice. e.g. it is stated that a mattress treated with it will remain free of bugs for 60 days. The material is covered by patents taken out in Britain by the Swiss firm Geigy A.G. B.P. 547 871 refers to compounds of the form



where X is chlorine or bromine. R_1 is an organic radicle with at least 3 carbon atoms and R is a radicle with at least 5 carbon atoms. The compound dichlor diphenyl trichloroethane can be made from chlorobenzene, chloral (or chloralhydrate) and sulphuric acid. In view of its formula it is surprising that this substance is non-irritating to man but very highly toxic to insects. It can be made up as an emulsion in water by a number of methods of which examples are given in the patent specification.

B.P. 547 874 covers the same type of compound in powder form. This comprises dilution with an inert dust such as bentonite or bole either by mixing or by application in a solvent and subsequent drying. Examples of solvents and methods are given. The final powders can be used directly as stomach or contact insecticides. One example however concerns deposition of the chemical on bentonite together with a wetting agent and sodium carbonate then treatment with a

gelatin and potassium bichromate solution and finally drying. The powder obtained in this way can be wetted and diluted with water for preparation.

J. I. Bustine

WAP OFFICE ARMY MED DEPT BULL No 25 1943 July 7 An
Experiment with the Lethane Body Belt

The lethane belt is understood to be a device which offers attractive baiting to lice and in which they tend to take up their quarters. It is doped with a non-volatile insecticide (lethane 384 special) which continues to kill them even when the belt has been worn for long periods.

Larval numbers of body lice were recovered from a typhus patient. Some were ground up and shown to be infective by being injected into a guinea pig. Other after grinding were placed between two layers of lethane belt. Even after 48 hours intimate contact with the lethane belt as shown that the material was still infective.

In the author's original report (of which this is a brief version) he remarks that every time worned the garments louse faeces arose in the form of a fine powdered dust. This material as highly infective and a few pecks of it emulsified in saline and injected in a guinea pig produced a high rise of temperature to 106 F in 5 days. He states that one small amount of dust at the faecal dust from such a garment. Indeed if any part of the dust was rinsed in saline and the fluid injected in a guinea pig immediate infection resulted suggestive of massive amounts of virus.

P. A. Burton

PATINO CAMARGO L. T. Murino en Bogotá Nota preliminar
[Murine Typhus in Bogotá] *Rev. Fac. d. Med. Bogotá* 1943
Mar. 11 No 9 503-14 6 figs on 2 pls. English summary

Three types of Rickettsial fever have now been identified in Colombia. Two of the three are regarded as belonging to the typhus group: they are louse-borne epidemic typhus and flea-borne murine typhus. The third is the tick-borne spotted or petechial fever which the author follows the usual North American custom places in a separate group.

In the present paper details are given of the isolation of murine Rickettsiae on three separate occasions in Bogotá.

(1) In October 1941 from the blood of a patient from the brain of 6 out of 22 rats (*Rattus albus* and *R. norvegicus*) caught in the place where the patient had been working and from an emulsion of fleas (*Xenopsylla conformis* and *Cleptopsylla segnis*) caught on the rats.

(2) In April 1942 from the blood of a patient and from fleas caught on rats from the warehouse where the patient slept.

(3) In July 1942 from fleas collected from rats at a residential school in which seven cases of fever had occurred between 29th April and 29th June 1942. From at least 3 of 11 rats caught on the premises in July Rickettsiae were isolated. The rats were *I. fortis* *is-decus* *m*. The responses of different guinea pigs to each lot of rat brain and flea emulsion varied from no apparent reaction to typical fever with or without. Six of the patients reacted to *Proteus OX19* at titres ranging from 1:100 to 1:500 and three to *P. OX19* 1:100 1:400 and 1:800 respectively. One patient was negative to *OX19* and positive to *OX18*.

John B. D. McFar

SINGH B. A Case of Typhus Fever. *J Indian Med Ass* 1943 May
v 12 No 8 212 1 chart

An isolated case of fever whose clinical features corresponded with those of Indian tick typhus is described briefly. The place of occurrence was Meerut about 40 miles from Delhi and the patient a lady aged 40 was living in conditions in which the possibility of infection through lice was inconceivable. There were dogs in the house ticks were noticed in the rooms and infection by ticks was regarded as probable. This was only the third case seen by the author during 30 years in Meerut.

The chief features of the attack were—Duration of the fever 14 days. Onset on 25th September 1942 was with pains in the back and joints. The temperature was 101.2 F on the first day. It rose gradually to 104.2 on the fifth day and fell by gradual lysis from the ninth day. There was apathy on the fourth day and low muttering delirium from the fifth day. The blood examination [day of fever not stated but probably about the sixth day] showed total leucocytes 12,800 polymorphonuclears 82 per cent monocytes 1 per cent lymphocytes 17 per cent. The Widal and Weil-Felix reactions were negative. The rash appeared on the fifth day at first there were rose red papules these became dark red and faded after a week leaving brown discolouration. The spots were profuse on the forearms and legs fewer on the upper arms and thighs and very few on the trunk and lower part of the neck there was none on the face. The rash resembled that of secondary syphilis. Clinically this was a typical example of the tick typhus of India and the epidemiological evidence strongly supports this diagnosis.

[The reviewer has seen a case of the disease in which infection occurred in the cold season in the same area. In this case exceptionally there was a local necrotic sore with associated lymphangitis at the site from which a tick had been removed just before the onset of the fever. In this case also a dog was probably responsible for transporting the tick to the patient.]

John W. D. Megaw

CAVAZZI G. Segnalazione di cinque casi di febbre bottonosa sull'altopiano Etiopico [Record of Five Cases of Boutonneuse Fever in the Ethiopian Highlands]. *Boll d Soc Italiana di Med e Igiene Trop* (Sez Eritrea) Asmara 1943 v 2 No 2 5-9 [11 refs.] English summary (4 lines)

Boutonneuse fever has not hitherto been clearly identified in the Ethiopian Highlands. The five cases now described occurred in Gondar and Asmara [altitude about 7,500 feet].

The temperature rose gradually then there was continuous fever with slight morning remissions and the termination was by rapid lysis. The fever lasted 12 to 15 days. There was a tache noire in the form of a black scab surrounded by a zone of erythema this appeared at or even before the onset and persisted till the end of the fever or even a few days longer leaving a red spot which soon disappeared and left no scar. Delirium was frequent at about the 10th day.

The rash appeared on the 2nd to the 5th day first on the trunk then all over the body including the face palms and soles. In three cases the rash was papular in two it was petechial and resembled the rash of louse borne typhus.

In one case the Weil Felix reaction was negative in the others the reaction did not become positive till the temperature had fallen. The titres to V19 were 1-80 1-160 1-160 and 1-640.

The attacks were more severe than those described as typical of boutny usef although all the patients recovered.

In the summary in English the disease is called tick bite fever.

John W. D. McAra

BAILEY G. E. Rocky Mountain Spotted Fever. *J. Amer. Med. Ass.* 1943 July 24, Vol. 12, No. 13, 841-50, 8 fig. [Refs in footnotes]

The author writes from the point of view of a physician with considerable personal experience of the disease in a part of Wyoming where severe and moderately severe cases predominate. He makes the interesting remark that it is felt by some that in the future the name Rocky Mountain spotted fever will of necessity be changed. The name tick fever is frequently used in the paper as a synonym.

The description of the disease is on orthodox lines. Ticks are not usually found on the patient but indurated sites of their previous attachment can often be palpated, the bite areas sometimes show desquamation and all lymph nodes are at times palpable and tender. The petechial eruption first appears on the wrists and ankles within a few days of the onset but it may be difficult to detect till it spreads and becomes conspicuous. It is always more prominent on the extremities than elsewhere and it may be absent especially in mild attacks. Pigmentation persists at the sites of the spots and may be noticeable for several months whenever the skin is exposed to heat or cold. The temperature is sometime distinctly remittent after the first few days it falls by rapid or slowly. In very severe attacks it may remain normal till 24 hours before death. A secondary rise always suggests some complication. The pulse is relatively slow, the leucocyte count averages 12,000 to 15,000 but may be as high as 30,000.

In infected areas some protection may be afforded by tick proof clothing and by removing the clothes two or three times daily and making a thorough search for ticks especially in the parts that escape friction by the clothing. Ticks should be removed immediately by gentle traction, if this is not enough a small wedge of skin should be removed by scissors and the wound should be treated by phenol or iodine. Care should be taken to avoid crushing ticks owing to the risk of infection through the unbroken skin. Ticks crawling on the body or even biting seldom attract attention. Scepticism is expressed with regard to the view that ticks cannot infect till they have been attached for several hours.

Treatment is on general lines fluids are given freely by mouth or when necessary by other routes. Convalescent serum appears to be useless but hyperimmune serum of rabbits may be of value. The author believes that he has had success with intravenous injections of 0.3 gramme neoarphenamine in 10 cc of a 1-1,000 aqueous solution of metphen injected at the rate of 1 to 2 cc a minute and repeated every three or four days. The urine must be tested before each injection to ensure the absence of renal damage. About 30 cases have been treated in this way without a death and with apparent benefit.

(On the other hand PARKER and other experts believe that intravenous medication of any kind usually hastens the death of experimental animals.)

The incidence and severity of the disease varies greatly from year to year for example the fatality rate in Wyoming was 12.3 in 1941 and 20.5 in 1942. The highest recorded was 31.7 in 1930 and the lowest 11.7 in 1933.

John W. D. Megaw

DAVIS G. F. American Q Fever. Experimental Transmission by the Argasid Ticks *Ornithodoros moubata* and *O. hermsi*. *Pub Health Rep* Wash. 1943 June 25 v. 58 No. 26 984-7.

Ornithodoros moubata fed in the 1st nymph stage on a guinea pig infected with *Rickettsia diaporica* transmitted infection by feeding up to 428 days and harboured the Rickettsiae for 670 days. The tick did not transmit infection by feeding till the adult stage was reached. The progeny of infected ticks were capable of transmitting infection by feeding. This tick is widely distributed across Central Africa and in parts of South Africa where it is the chief vector of tick borne relapsing fever. It may be a natural vector of Q fever in these areas though the disease has not been reported from Africa.

O. hermsi infected as 1st or 2nd nymphs transmitted infection up to 772 days and harboured Rickettsiae for 979 days. In a smaller series of tests the progeny of this tick did not transmit infection by feeding.

Long periods of fasting did not diminish the virulence of the organisms in ticks.

John W. D. Megaw

MARIE P. L. Maladies infectieuses des confins polonourusses: fièvre de Volhynie, fièvre d'Ukraine. [Infectious Diseases in Poland and Russia. Volhynian Fever (Trench Fever) and Ukrainian Fever]. *Presse Med* 1943 July 17 v. 51 No. 27 388-90. [11 refs.]

This paper contains a good summary of the literature dealing with the recent outbreaks of trench fever in the German army on the eastern front.

The articles dealt with by the author have already been reviewed in this *Bulletin* [1942 v. 39 758 (JACOBI J.) 1943 v. 40 136 (KERGER H.) 301 (ARNETH J.) and 838 (v. BORMANN F.)] but in view of the potential importance of the disease to military medical officers it is worth while to recapitulate the types of fever that have been encountered by German physicians. These are—(1) The classical recurring type in which paroxysms of fever occur every four to six days over periods ranging from ten days to two months or more. (2) The undulant type: this is relatively uncommon. The periodicity of the spells of fever is the same as in the preceding type but instead of sudden sharp paroxysms of fever there are recurring short waves lasting two to four days: each spell has a gradual rise and a gradual fall of temperature. (3) The subfebrile type with more or less continuous fever lasting one to three weeks and occasionally followed by a further spell of fever of one to two weeks duration after a fever free interval of two to three weeks. (4) The abortive type in which there is slight fever for three or four days: sometimes there is no fever at all. (5) The typhoid like type in which the curve resembles that of mild typhoid but often this is preceded or followed by a period of recurring or undulant fever. (6) The typhus like type differing from the preceding in the sudden onset and the continued fever: this is usually followed by a period of recurring or undulant fever. (7) The delayed fever type in which

there are periodic symptoms for one to three weeks with occasional irregular rises of temperature which are hardly noticeable. Then one or other of the above types of fever follows.

The relative frequency of these types was very variable in the different outbreaks. The recurrent type was seldom predominant more often the subfebrile or the larval type was the most common.

The pairs have variable variability. Severe limb bone pain most pronounced during the febrile period, and greatly aggravated by warm hands and decubitus were usual but by no means invariable. Often the pain was referred to other parts of the body and tended to shift from place to place. One constant feature was the absence of objective signs at the sites of the pain. No deaths have been recorded. In certain outbreaks a rash was seen in some cases. This macular and erythematous usually it was scanty and fleeting. A diagnostic test was available.

John H. D. McEwen

BARTONELLOSIS

MERA B. Present Status of Human Bartonellosis. *Bol. Oficina Sanitaria* 1943 Apr. 22 No. 4 304-9

This is the best exposition of the subject within the known limits of the literature. It is at the same time succinct and thorough. The problem in Colombia in 1936-39 which PATINO CABARCOS showed to be bartonellosis after various suggested diagnoses of malaria, typhoid, typhus and brucellosis had proved erroneous is referred to [see this *Bulletin* 1940, 37, 271 SS.]. Human bartonellosis is an infective disease exclusively American and exclusively tropical. Its distribution the Andes between latitudes 2°N and 13°S and the main vector *Phlebotomus perniciosus* and *P. noguchii* in Peru seven species are found in Colombia but which is the chief vector is not known. Other arthropod may be capable transmitters e.g. *D. imitator* and *A. leprosus* but are not proved natural vectors. Suspected reservoirs are many. Euphonia, chickens, guinea pigs, field mice, the only certain one is man. The symptoms are divided into the two periods of haematic (systemic) and histoid (cutaneous) which may exist independently or may coexist or may occur successively. The pathology and pathogenesis are described. The anaemia—the loss of red cells may be 200,000-300,000 per cmm daily till the total count may be half a million or less—is ascribed to three factors (by HURTADO). (1) The direct action of the organism growing in the corpuscles. (2) The tissue haemorrhages. (3) A haemolytic action of the *Bartonella*.

Control and prophylaxis are not easy. To deal with the reservoir is a problem at present unsolvable because we do not know what are the reservoir except man. To destroy the larvae in cracks and crevices of wall and rocks not feasible. There remains the breaking of the vector-man link by attention to the following four rules—

(a) All individual who work in the suspected zone should leave it before 6 p.m.

(b) All individual who are compelled to spend the night in such a zone should carefully screen all the house, destroy the insects and use repellents.

(c) The houses should be built in such a way that they get the most light possible without dark corners and without any cracks or crevices. All the walls should be painted once monthly with creosote.

(d) Instruction of the public and improvement of the nutrition and living conditions are of course of prime importance in order to build up physiologic resistance to the infection. *H. Harold Scott*

HOWE C Carrion's Disease Immunologic Studies *Arch Intern Med* 1943 Aug v 72 No 2 147-67 2 figs

A painstaking study resulting in conclusions of considerable importance in this interesting disease. The primary purpose of the author was to examine the immunological response in relation to the course of the disease and the part played if any by agglutinins. The investigation was carried out in an endemic focus of the disease near Lima, Peru, and on patients in hospitals in Lima who had contracted the infection in endemic areas. Three species of *Phlebotomus* abound in verruga zones: *P. noguchii*, *P. peruensis* and *P. verrucarum*, the last being the chief vector. In all 203 residents were examined, many of them new arrivals and most of them workers on an electric power project in the Santa Eulalia river valley. Blood cultures were made for each patient on the Geiman medium [this *Bulletin* 1941 v 38 690] kept at room temperature ($28 \pm 2^\circ \text{C}$). blood examination included

Carrion's Disease

Group	Blood Cultures	Agglutination	Eruption	Constitutional Symptoms	Past History of Carrion's Disease	Number in Group	Percentage of Series
1	+	+		+	-	16	7.9
2	+	+	+		-	9	4.4
3	-	+	+		-	6	3.0
4	+	-	+		-	15	7.4
5	+	-		+	-	3	1.4
6	+	3- 1+	-	-	3+ 3-	6	3.0
7	-	+	-	-	3+ 3-	6	3.0
8	-	-	+	-	-	24	11.8
9	-	-	-	-	+	56	27.6
10	-	-	-	-	-	62	30.5
Number positive	49	38	51	19	62	203	100.0
Percentage of total	24.1	18.7	26.6	9.3	30.5		

DELGADO BEDOYA G Verruga Peruana y malaria asociadas [Coincident Verruga peruviana and Malaria] *Rev Facul de Med Bogota* 1942 Mar v 10 No 9 593-602 [16 refs]

In 1931 Professor ARCE reported malaria as a frequent complication of Carrion's disease and second to this bacterial infections especially of the coli typhoid group. HURTADO in 1938 remarked on the difficulties of diagnosis when the malaria masked the verruga especially when as is often the case the verruga and malaria districts were the same. Splenomegaly for example was looked upon as a feature of Carrion's disease whereas it was due to the malaria enlargement of the spleen not being characteristic of the former disease. Blood changes are also complicated. Anisocytosis is more common in Carrion's disease macrocytosis is not common in malaria reticulocytosis is less seen in malarial anaemia whereas leucopenia is more frequent. HURTADO POYS and MERINO conclude that macrocytosis hypochromia reticulocytosis marked anisocytosis and a normal relative leucocyte formula are points in favour of a diagnosis of Carrion's disease.

The author goes on to record the case of a man of 20 years in whose blood *P. vivax* was seen while he was suffering from an attack of Verruga peruviana. Incidentally the Wassermann reaction was negative in June but when the Kahn test was tried a month later while the disease was still in progress a 3 plus was obtained. Later in his illness he suffered from a dysenteriform colitis with nine stools in the day [nothing is said of any bacteriological examination to determine the causative organism]. The patient was in hospital for four months.

H Harold Scott

YELLOW FEVER

BRAZZAVILLE [AFRIQUE FRANÇAISE LIBRE] RAPPORT SUR LE FONCTIONNEMENT TECHNIQUE DE L'INSTITUT PASTEUR EN 1941 [CECCALDI J Director] 46-53 Fièvre jaune [Yellow Fever]

During 1941 a total of 780 vaccinations against yellow fever have been made at the Institute using subcutaneous inoculations of a vaccine supplied by the Rockefeller Foundation made from tissue culture virus.

The Dakar strain of neurotropic virus has now reached its 414th passage in the brains of mice the Saleun Ceccaldi strain from Brazzaville has reached its 98th passage.

Details are given of the examination of the sera from two Europeans suspected of yellow fever. One of these from Donghila gave protection against at least 1840 mouse units. The serum of the second subject vaccinated against yellow fever in Paris 31 months previously showed no sign of any protective value. Tests were also made of four sera from natives collected in 1941. One of these from Mayumba protected against at least 1280 mouse units.

During 1941 three Europeans and also three natives four from Gabon and two from Cameroons were diagnosed as cases of yellow fever as a result of a study of the pathological anatomy of the organs.

E Hindle

Treatment is purely symptomatic drugs that appear to have a favourable influence on the fever have no real effect other than that of delaying complete recovery

[The author probably exaggerates the degree of immunity that follows an attack Experiments on volunteers and many observations show that second attacks are relatively common though these are usually mild Third attacks are infrequent and some experienced workers believe that fourth attacks rarely or never occur]

John W D Megaw

PLAGUE

MACCHIAVELLO A Epidemiology of Plague in Ecuador *Amer J Pub Health* 1943 July v 33 No 7 807-11

The author a well known writer on plague does not support the very current theory that in the Andean region it is the guineapig (*Cavia aperea*) and its fleas *Rhopalosyllus cavicola* and *P irritans* which play the most important part in human plague Undoubtedly the guineapig is one of the most susceptible of rodents to plague It is a domestic animal in Uruguay living in close household contact with the Indian population which uses it as the principal source of meat On the other hand the flea *R cavicola* has not been recognized as a vector of plague from the guineapig to man nor yet has *P irritans* attained to any very important epidemiological rôle in the plague of other countries One of the arguments which is said to favour the guineapig theory is that in general domestic rats are scarce in the Sierra

This statement has not been confirmed but instead domestic species especially *R rattus* and *R alexandrinus* have been found to be universally distributed The rat flea *X cheopis* finds climatic factors in the zone 8 900 to 9 900 feet above sea level quite satisfactory at least seasonally for breeding All that the guineapig may contribute to the plague epidemiology is as a reinforcing factor in the infection because it is a co dweller with man acts as a flea trap and is extremely susceptible to plague Thus the author contends that rural plague of the inter Andean region conforms to the classic rat flea mechanism with changes imposed by the climatic characteristics under which the biologic activities of the rats and fleas are conducted All the other phenomena foreign to this rat flea mechanism should be considered accidental manifestations without any fundamental influence on it

W F Harney

CHOLERA

PANJA C & PAUL B M A Study of Invasiveness and Toxicity of Cholera Paracholera and Saprophytic Vibrios in Animal *Indian Med Ga* 1943 Apr v 78 No 4 190-91

Cholera and cholera like vibrios have to be differentiated as part of the technique of bacteriological diagnosis of true cholera The further subdivision of the cholera like vibrios is expressed in the qualifying

terms para cholera and saprophytic. Animal tests have not bulked largely in the immediate differentiation of these vibrios but the authors have applied them to that purpose. All three types of vibrio may be lethal to guinea pigs by subcutaneous injection but as indicated in the summary the important distinctions are — (1) Para cholera and para cholera vibrios when injected subcutaneously in suitable doses into guinea pigs invade the general circulation within 2 hours but saprophytic vibrios found in H. H. water do not do so so early. (2) No definite distinction can be made among the above types of vibrios by feeding in guinea pigs and by intravenous injection into rabbits. All the types of vibrio produce fatal results in the animal. The non agglutinating vibrios produce a slightly higher percentage of fatality. W. F. Harvey

CALLIET J. Le complexe glucolipidique cholérique dans le vibron et dans sa toxine. The Glucolipidic Complex in the Cholera Vibrio and its Toxin. *Annales de l'Institut Pasteur* 1943 Mar-Apr 69 No 3-4 123-6

If it be admitted that endotoxin of glucolipidic nature and exotoxin is protein then the author claims to have prepared a cholera toxin which contains both components. Endotoxin has been identified by BOVIN with the glucolipidic complex of Gram negative bacteria and a O antigen. In his researches Gallut has extracted this glucolipidic substance from fresh type S vibrios of 18-hour growth on peptone agar. He has also obtained glucolipid from the toxin of a 4 hour growth on glucose medium that is to say from the combined endo- and exotoxin. The yield of glucolipid is in this case always greater than that obtained directly from fresh vibrios. By this method of preparation a cholera toxin has been obtained in a minimal growth time and it contains both the glucolipidic and protein types. W. F. Harvey

PANJA C & GHOSH S I. Lethal Action of Potassium Permanganate on Vibrios. *India Med Gaz* 1943 June 78 No 6 288-91

Potassium permanganate has long been used for the disinfection of well water, vegetables or fruit and stools during cholera epidemics. The present study gives precision to the activity of the permanganate by working out lethal dosage according to concentration, number of organisms present and presence of organic matter. Well marked differences were found in the action of the permanganate on true cholera vibrios, non agglutinating vibrios and unrelated organisms such as *B. typhosa*. The results are summarized. Potassium permanganate in a high dilution of 1 in 10^6 in re-distilled pyrogen free water is bactericidal to *Vibrio cholerae* and a still higher dilution of 1 in 10^5 lethal to non agglutinating vibrios. Much higher concentrations fail to kill even a small number of *B. typhosum*. In the presence of organic matter a lower dilution such as 1 in 5000 is necessary to kill the vibrios. Fruits and vegetables artificially infected with cultures of *V. cholerae*, *B. typhosum* and *B. flexneri* can be effectively disinfected by soaking them in permanganate solutions of 1/5000 to 1/10000 dilutions for five minutes. W. F. Harvey

[These findings are surprising in view of previous reports of similar work. GORAR (see *Bulletin of Hygiene* 1937 12 58) found that

1 in 1 000 permanganate was not enough to free artificially contaminated vegetables completely from *Bact typhosum* BERNARD (see *Bulletin of Hygiene* 1938 v 13 400) concludes that it is impossible to sterilize salad leaves with permanganate without spoiling the appearance VAN DEN BRANDEN and GEENS (this *Bulletin* 1940 v 37 237) found that lettuce steeped in 5 per cent permanganate for one hour was not sterilized In view of these conflicting reports and of the importance of the subject it would seem desirable that further tests should be made —Ed]

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

SAVATEEV N I A Survey of Human Intestinal Protozoa in Sebastopol
Trauv Acad Milit Méd Armée Rouge (RSS Moscow
1941 v 25 [In Russian 394-8 English summary 398]

In this survey which is the first to be carried out in the Crimea the author records the incidence (in 1937) of intestinal protozoa in Sebastopol among two groups of hospital patients suffering from acute gastrointestinal disorders on the one hand and in a group of school children on the other hand The total number examined was 401 While the latter group represents native Crimeans the first two groups consist of newcomers to the country

In dealing with the dysentery amoeba the author distinguishes between the race producing small cysts (under 10μ in diameter) to which he refers as *Entamoeba hartmanni* and the race with large cysts (above 10μ) for which the name *E histolytica* is reserved

The results estimated for the different groups (per cent) were as follows *E histolytica* (sensu lato) 3.9-16.8 (comprising *E histolytica* ss 6-16.5 *E hartmanni* 5.1-23.5 *Endolimax nana* 10.2-22.0 *Iodamoeba butschlii* 5.1-23.5 *Giardia intestinalis* 16.0-23.3 *Trichomonas hominis* 11.5-16.8 *Chilomastix mesnili* 7.6-15.4 *Balantidium coli* 0.4 (one case) The specific composition of the intestinal protozoal fauna in Sebastopol proved to be similar to that in other parts of the Soviet Union

E histolytica (sensu lato) was represented by both active forms and cysts in the hospital patients (first two groups) and by cysts alone in the school children Since none of the patients showed clinical symptoms of amoebic dysentery and there was no evidence of haematochezia on the part of the parasites the presence of active amoebae in the stools is attributed to the looseness of the faeces while the persons themselves are regarded as symptomless carriers of *E histolytica* C A Hoare

GNEZDILOV V G On the Commensal and Parasitic Forms of the Intestinal Protozoa in Connection with the Question on their Pathogenic Significance
Trauv Acad Milit Méd Armée Rouge (USSR Moscow
1941 v 25 [In Russian 370-92 16 figs (6 on 1 pl) (36 refs) English summary 392-3]

It is well known that in spite of the cosmopolitan distribution and high incidence of infections with *Entamoeba histolytica* cases of amoebic dysentery are comparatively rare and limited in their distribution To

explain the discrepancy various hypotheses—which the author reviews—have been advanced. He adopts the views of REICHENOW [this Bulletin 1937 20 171] and WESTPHAL [this Bulletin 1935 1 30 586 1939 36 288] according to which *E. histolytica* is normally a harmless commensal living in the lumen of the intestine but under certain conditions found mainly in hot countries the amoeba becomes a tissue parasite giving rise to the pathological conditions known as amoebiasis and amoebic dysentery. The factors favouring the passage of the amoebae from the lumen into the tissues have not been determined. It is suggested that the change in the habits of the amoeba may be influenced by the degree of structural and functional intactness of the gut, all by the host's diet and state of nutrition and by the symbiotic association of the amoebae with the intestinal bacteria. The author also believes that overheating, chill, fatigue, malnutrition as well as acute intestinal disorders, traumata and intoxications also tend to increase the virulence of the amoebae.

The normal form of *E. histolytica* which is found in the lumen is said to be the small, more generally described as the precystic form while the larger form which corresponds to the conventional active or vegetative amoeba is regarded as the phase assumed by the lumen form when it invades the tissues. According to this interpretation the large amoeba does not represent a necessary and indispensable stage in the life history of the species. The two forms are said to differ not only in the morphology (12) of the active amoebae but also in their feeding habits: the small commensal (=lumen form) subsisting on bacteria while the large pathogenic parasite (=tissue form) invades erythrocytes. It is proposed to call the former phase *E. histolytica* forma normalis (mean diameter ca. 12) and the latter *E. histolytica* forma magna (mean diameter ca. 26).

The author maintains that some of the other human intestinal protozoa manifest morphological and biological differences of the same order. Thus *Entamoeba coli* is said to comprise two forms. One is the typical harmless commensal living in the lumen of the intestine and feeding on various micro-organisms and food particles. The other form is identical with the amoeba formerly described as *Coenotrypanum histolyticum*; it is larger than the normal amoeba, its feeding is osmotic (saprozoic) and under certain conditions it is capable of invading erythrocytes. There would thus appear to be a parallelism between this species and the dysentery amoeba but whereas the magna form of *E. histolytica* is fully adapted to tissue parasitism the corresponding form of *E. coli* manifests only a slight tendency to invade the tissues. The larger amoebae (mean diameter 28) are distinguished from the normal ones (18-24) by the name *E. coli* forma magna.

It is further noted that *Balantidium coli* may also consist of distinct strains. Some live in the lumen of the gut without producing any symptom while others invade the gut wall and give rise to balantidial dysentery. As in the amoebae this transformation is associated with a change of diet: instead of bacteria, starch, etc. the ciliates ingest erythrocytes and other blood elements. The pathogenic form of *Balantidium* is said to be larger than the commensal phase and is distinguished from the latter by the name *B. coli* forma magna. All the factors responsible for the development of tissue parasitism in the ciliates are not known but the author believes it may be due to a diminution of carbohydrates in the intestinal contents.

Finally the author considers the case of *Trichomonas hominis*. It is pointed out that this flagellate may occur in the pus of liver abscess and is capable of invading the intestinal wall. Moreover trichomonads found by the author in cases of bloody diarrhoea frequently contained ingested red blood corpuscles. In view of these facts this flagellate cannot be regarded as entirely harmless. The haematophagous forms which were found to be larger than the typical ones are designated as *T. hominis forma magna*.

In conclusion and by way of summary the author develops the general thesis that the intestinal protozoa considered above normally live as harmless commensals in the lumen of the gut where they feed on its contents. Under certain conditions—especially prevalent in the tropics—they are capable of invading the intestinal wall with the result that they become truly parasitic or even pathogenic. The tissue forms absorb nutrition by osmosis or they ingest red blood corpuscles and they can be distinguished from the lumen forms by their larger dimensions. While the pathological effects of *Entamoeba histolytica* and *Balantidium coli* are beyond doubt the aetiological rôle of *Entamoeba coli* and *Trichomonas hominis* in various intestinal disorders though suspected stands in need of further investigations.

The paper is illustrated by figures showing the appearance of the protozoa in their commensal and parasitic phases. C. A. Hoare

YONIS Z. Amebic Arthritis. *Harefuah*. Jerusalem 1943 Apr 15 v 24 No 8 [In Hebrew 134-5. English summary 135].

A six year old child was suffering from inflammation of the elbow joint for six weeks.

The joint was swollen, its movements were limited and painful. At times there was fever. The blood picture was normal. Mantoux Kahn negative. BSR increased. X-ray pictures of the affected joint were taken after the fourth and sixth weeks of the illness without any pathological findings.

Diagnostic features of the inflammation are discussed. The puncture of the joint was avoided. In the stools trophozoites and cysts of *Ent. histolytica* were found. Under treatment with Emetine hydrochl and Yatren all the symptoms disappeared and the child recovered.

HAUER A. Erfahrungen mit einem neuen Mittel gegen Ruhr Amöben Infektion [Experiences with a New Drug in Amoebiasis]. *Deut Trop Ztschr* 1943 Apr 1 v 47 No 7 153-61.

The increasing incidence of amoebic infection and the uncertain action of yatren (quinoxyl) which is almost universally employed in Germany together with many unsatisfactory features of several arsenicals in the treatment of amoebiasis have rendered a quest for a new remedy advisable.

The present communication deals with the I.G. preparation 9659A—an arsenical bismuth compound Wia. It is claimed that the bismuth component prevents the uncontrolled absorption of arsenic from the damaged bowel and the sudden appearance of toxic manifestation. The Wia preparation is a white powder which is insoluble in water.

OCHSNER A & DEBAKEY M Amebic Hepatitis and Hepatic Abscess
 An Analysis of 181 Cases with Review of the Literature *Surgery*
 1943 Mar & Apr 13 Nos 3 & 4 460-93 612-49 17 graphs
 & 24 figs (1 coloured) [431 refs]

A detailed and full but not too full account of the subject giving much information and well documented—in fact almost a monograph on a subject of perennial interest. The authors start with an abridged but adequate history of amoebic dysentery and its hepatic complications and sequelae and then consider the incidence of amoebiasis in the United States first in general and then from the aspects of age, sex and possible contributory factors. CRAIG estimated that between six million and twelve million people in this country are infected with this parasite—truly a wide range—but the present author thinks even the upper limit far too conservative and that the figure is nearly twice this 20-25 million and that 4-5 per cent of these suffer from hepatic complications, i.e. approximately one million. Sex certainly seems to play a part for of 1789 cases of amoebic hepatitis and abscess collected from the literature 1703 or 95 per cent were males and of the authors 181 cases 157 or 86.7 per cent were males. ROGERS and VEGAW found that 70 per cent of some 400 cases analysed were in the third and fourth decade of the authors series the youngest patient was six years old the oldest 70 and the average age was about 40 years. A few words are given as to the possible influence of alcoholism, trauma, diet, season etc. They next discuss the pathogenesis and pathology of the condition noting that two main factors are intrahepatic portal thrombosis and infarction by the amoeba and its cytolytic activity. In the early phase there is a balance between regression to healing and scar formation and progression to abscess and the balance is weighed down by the number and virulence of the organism overcoming the relative resistance of the host or by the effect of bacteria, alcohol, trauma and the like.

The relative frequency of cardinal symptoms is detailed in the succeeding clinical section. In this analysis (181 cases) liver pain and tenderness were present in 86.7 per cent, fever in 84.5, enlargement of the liver in 72.9, loss of weight in 48, diarrhoea in 25.4, nausea and vomiting in 22.1 and jaundice in 10.5 per cent. The laboratory findings considered are the blood changes, the complement fixation test, examination of stools and X-ray appearances. As regards the first table is given stating the numbers of leucocytes of the neutrophils of erythrocytes and the percentage of haemoglobin. The complement fixation test is not very serviceable owing to the highest lowest and the average of each of these among the 181 cases. The complement fixation test is not very serviceable owing to the difficulty of obtaining a potent antigen. Sections follow on diagnosis and prognosis. Important factors in prognosis are the number of lesions in the liver, the existence of complications or of secondary infections and the type of treatment used. SAMBUC in Haiphong in 1913 found that the mortality rose with the number of abscesses: 23 per cent in those with single abscess, 45 per cent in those with two, 90 per cent in those with three while of those who had four or more all died. In the authors series 124 had single abscesses and the fatality rate was only 10.5 per cent of 16 cases of multiple abscesses all ended fatally. The mode of operating also affects the prognosis, thus of 24 cases with transpleural drainage eight were fatal of 23 with transperitoneal drainage seven while of 15 drained by the extraperitoneal route only one

proved fatal [these figures are given as 33.3, 30.4 and 6.6 per cent respectively].

The second part of the article deals with treatment. Aspiration is the procedure of choice if evacuation is necessary, but preliminary administration of emetine is important. In the authors' series among 80 who underwent open drainage there was a 22.1 per cent mortality whereas among 83 with conservative therapy there were only three deaths, 3.6 per cent. Open drainage is usually needed in those secondarily infected. The operation of open drainage is described and the complications which occurred were pleuropulmonary involvement 26 times in the authors' series, peritonitis 13 and pericarditis once only.

The article ends with descriptions of five illustrative cases: (1) A satisfactory response to conservative therapy. (2) Abscess responding satisfactorily to emetine and aspiration. (3) An interesting case in a woman of 34 years thought to be suffering from amoebic hepatitis with characteristic clinical signs and X-ray showings. She responded at once to emetine but a week later fever returned and a true abscess developed. (4) Amoebic abscess rupturing into a bronchus. (5) Abscess of liver opening into the right pleural cavity. (6) Abscess of liver opening into the right pleural cavity.

A valuable addendum to the article is the list of over 400 references.
H. Ha old Scott

CAMERO, J. A. M. An Unusual Amoebic Liver Abscess [Memoranda]
Brit. M. J. 1943 Sept. 11 329

A case of amoebic abscess of the left lobe of the liver in a Hindu woman is described. It was first treated with emetine hydrochloride injections 10 grains being given in 10 days. This was followed by a normal temperature but only for three days. The liver was then explored first the right lobe without result and then the greatly enlarged left lobe and 89 ounces of fluid like thin pea soup were removed with a Potain aspirator. The temperature remained normal for seven days and the emetine was stopped. The same signs and symptoms returned however and another 16 ounces of fluid were aspirated. As the patient continued to lose weight and strength open drainage was done and the cavity irrigated with eusol. The patient was discharged a month after the operation.
J. F. Corso

RELAPSING FEVER AND OTHER SPIROCHAETOSSES

GASPERINI, G. C. Considerazioni sulla epidemia di febbre Ricorrente nei distretti di Asghedè, Tsellum, Biet e Dambè Arcan (Tigrai Orientale) nell'ottobre-novembre 1940. [An Outbreak of Relapsing Fever in the Tigrai District] *Boll. d. Soc. Italia* 1941, 1 No. 3 32-6
Med. e I. en. Top. (Sez. Eritrea) Asmara

The villages or townships mentioned are in the Tigrai district of Northern Abyssinia. Fever broke out there and a team was sent to investigate. The condition was found not to be Mareb Fever which is the local name for malaria. Blood smears showed *S. p. relapsans*. Ticks were not found but head and clothes lice were. Clinically the

incubation period was about seven days during which the patient might complain of slight headache. There was no rash but a dry skin with a subicteric tinge enlarged and painful liver and spleen and fever lasting 5-6 days after an apyrexial period of the same length relapse occurred lasting 3-4 days. A single injection of Ncosalvarsan (0.45 gm for adults 0.3 for adolescents 0.15 for children) usually cleared up the symptoms. Two patients were recovering from typhus and their blood gave a positive result to the Weil-Felix test in dilutions of 1:5120 and 1:10240 respectively.

In two villages the infection was severe and some deaths occurred. These were Addi Sarda and Addi Serinnai. The number of cases there is not stated figures being given only in percentages of the population attacked. In these villages these figures are given as 10.5 and 28.1 respectively and the deaths as 7.5 and 15.6 from which it would appear that more than two thirds of the patients in the former and half of those in the latter died.

H Harold Scott

CHORINE V & CROUGUE O. Virulence du sang du cobaye infecté avec le *Spirochaeta hispanica* [The Virulence of the Blood of Guinea-pigs Infected with *Spirochaeta hispanica*] *Ann Inst Pasteur* 1942 Nov-Dec v 68 Nos 11-12 518-23

The authors have made a comparative study of the virulence of the blood of guinea-pigs infected with *S. hispanica* by the bites of *Ornithodoros erraticus* at the beginning of the attack when spirochaetes are very numerous and during the intervals when the organisms cannot be found in the blood. The number of spirochaetes in the blood at the beginning of the attack is surprisingly high and the inoculation of 1/10 000 000 cc of the plasma of an infected animal is sufficient to produce infection. During the remissions when spirochaetes are not seen the blood is much less virulent and it is necessary to use doses of 100 000 to 1 000 000 times greater in order to be sure of producing infection. The author then discusses the numbers of spirochaetes in the blood at the different stages of infection and estimates that during the remissions there are only 10 to 100 organisms in 1 cc of blood compared with 1 000 000 to 10 000 000 during the attacks. Under these conditions the absence of spirochaetes during the negative phase may be explained as being only apparent the result of the difficulty of finding organisms present in such scanty numbers. In addition the authors are of the opinion that it is very difficult to interpret the various atypical forms seen after silver impregnation which have only a very remote resemblance to spirochaetes.

E Hundle

CHORINE V. Culture du spirochète de la poule [The Culture of the Fowl Spirochaete] *Ann Inst Pasteur* 1942 Nov-Dec v 68 Nos 11-12 524-7

The author recommends a medium composed of unheated rabbit serum diluted 1 in 5 with 0.5 per cent peptone water. The latter is prepared by adding 5 gm peptone to 1 litre of distilled water containing 7.5 gm NaCl. After boiling for 5 minutes the pH is adjusted to 7.4-7.5 and the solution autoclaved at 120 C for 10 minutes. The liquid is filtered whilst hot into flasks each containing 150 cc and these are autoclaved at 115 C for 20 minutes. After mixing the serum and

[December 1943]

peptone water in narrow test tubes these are incubated at 37 C for 24 hours to test for sterility and then covered with a layer 1 cm thick of sterile paraffin and again tested for sterility.

When making the cultures a few drops of defibrinated blood may be added or preferably laked blood prepared by mixing 2 volumes of distilled water with 1 volume of defibrinated guinea pig blood. After standing for 2 hours 10 per cent NaCl solution is added in sufficient quantity to re-establish the ordinary molecular concentration of blood.

The mixture is then shaken centrifuged at high speed for 20 minutes and the supernatant fluid filtered through a Chamberland L2 or L3 candle. When making cultures 1 part of this laked blood is added to 10 parts of the serum peptone medium. The spirochaetes are then inoculated and the tubes incubated at 28 to 29 C.

Maximum growth is usually obtained about the 7th to the 10th day. Subcultures should be made about every seven days although spirochaetes may be seen up to 21 days from the inoculation.

Cultures isolated 14 months previously and having undergone 60 passages were found to be fully virulent and a few inoculated from this culture died of spirochaetosis five days later.

E Hindle

SERGEANT A & RICHARD H. Canquade
spécialiste de l'hygiène et de la
d'3000 no 431 [A Unique Case of Inborn Resistance to a Guinea Pig
to North African Spirochaetosis] A h i t P a s t u d A l t
Dec 20 No 4 1943

DERRICK E H. Leptospira a W t J l i t a l i a 1943 Apr 11
No 10 431

The author considers that the leptospira isolated in 1936 from the blood of a dairy farmer near Pomona in South Queensland (see this B M J 1937 34 704) should now be given a specific name as it has been shown to be distinct from the three other known strains of Australian leptospira and also from the three other known strains of the clinical picture is further definite resembling that of mud fever seven-day fever etc. In his cases of leptospirosis due to this strain have now been diagnosed in Queensland as a result of serum tests and many others have been diagnosed clinically.

The name *Leptospira pomonae* proposed for this organism which is distinguished from *L. interrogans* and other leptospires only by its serological reactions and its comparatively low virulence for man and laboratory animals.

JOHNSON D W. The Discovery of a Fifth Australian Type of Leptospira
spirosis W d J A s t a l a 1943 Apr 11 No 10 431-3
fig

The description of a fifth type of leptospira in Australia isolated from two cases of leptospirosis occurring in Queensland during 1940. One of these patients was a bullock driver and the other a meat inspector and clinical detail is given of the course of the disease. Both showed a sudden onset with headache and fever gastro-intestinal upset and generalized muscular and joint pains. *Leptospira* were

isolated from both patients and found to belong to a type serologically distinct from any of the known strains. The name *Leptospira mitis* is proposed for this organism. E Hindle

CLAPPER M & WATERS G B Clinical Manifestations of Weil's Disease with particular reference to Meningitis. *Arch Int rn Med* 1943 July v 72 No 1 18-30 4 charts [15 refs]

A description of 13 cases of Weil's disease occurring in the neighbourhood of Detroit USA during 1940 and 1941. In two of these cases there was both clinical and laboratory evidence of meningitis in seven there was an abnormal cellular reaction in the cerebrospinal fluid without clinical signs of meningeal irritation and in one instance meningismus without pleocytosis of the cerebrospinal fluid. Lumbar puncture was not performed in two of the cases. All the patients presented clinical evidence of hepatitis during some phase of the illness.

The authors say that cell counts on the cerebrospinal fluid may reach 1 000 or more per cmm with a predominance of polymorphonuclears early and of lymphocytes later. The dextrose content is not altered. Yellow discolouration is common and is due at least in part to bilirubin. Marked retention of urea is common. Pericarditis auricular fibrillation or disturbances of conduction may occur in hearts previously normal. Electrocardiograms are given of two of the cases. The plasma prothrombin although appreciably decreased in most instances usually does not reach levels sufficiently low to account for the haemorrhagic manifestations. Anasarca the result of hypoproteinaemia may develop. Immuno-transfusions may be of value in treatment and are worthy of a more extended trial. E Hindle

YAWS

GOLDMAN C H & SMITH S J X Ray Appearances of Bone In Yaws. *Brit J Radiology* 1943 Aug v 16 No 188 234-8 12 figs

This study is based on radiological examinations of 101 African civilians and soldiers in Sierra Leone (probably some of the latter also came from other West African Colonies). All lesions were in the tertiary stage. Active lesions were those in which acute osteitis, local pain and pyrexia were present. In inactive cases vague bone pains and malaise were predominant.

Positive Kahn tests, quick response to specific therapy and typical scars of secondary skin lesions were present in all cases. The tibia was affected in 46, the fibula in 20 (both leg bones in 19), the femur in 13, the ulna in 10, the radius in 7 (both forearm bones in six) and the humerus in nine. Among other bones the spine was involved in five cases, the skull in three and the pelvis in two.

The earliest active lesions in long bones were small oblong areas of translucency in the compacta appearing within four weeks of the onset of symptoms. Often a worm eaten appearance resulted. Periosteal changes were only present in association with changes in the compacta.

MARTÍNEZ BAEZ M. Nota preliminar sobre la histopatología de las manifestaciones cutáneas de la forma de Lucio de la lepra [Histopathology of the Skin in the Lucio Form of Leprosy] *Rev Facil de M d Bogota* 1942 Mar 10 No 9 610-22 8 fig on 1 pl English summary (5 lines)

Nearly a century ago in 1851 a Mexican doctor Rafael Lucio described a special form of leprosy, a macular form which has since been known as the Lucio leprosy. Lucio himself said that the pathological histology needed description and the usual text books omit details of the microscopic pathology of this form. In the present paper the author has rectified this omission basing his remarks on biopsy specimens of five patients taken tissue through the maculae. He finds in the dermis accumulations of inflammatory cells around the blood vessels dilatation of the vessels themselves changes in the art. n. walls and in some cases foci of necrosis in the cell accumulations. The vessel appear as if wrapped round by these inflammatory cell masses. The capillaries are swollen by endothelial cells and perivascular proliferation. In appropriately stained sections the endothelial cells are seen to contain Hansen's bacilli few or in globi. The perithelial aggregation consist of lymphoid elements relatively large histocytes irregular in contour but with homogeneous protoplasm. The sweat glands of the areas involved present narrowing of their ducts with almost complete obstruction by what looks like a mass of coagulated albuminoid substance and heaped up small epithelial cell. In one of the preparations examined there was necrosis of the secretory part of the gland extending to the excretory duct and the reticular tissue of the dermis. Similar exudate may be seen around the nerve trunks in the deeper parts of the dermis. In the arterioles the lumen is narrowed and the inner surface is irregular from salients of endothelial cell proliferation and the wall may be thickened to many times that of the diameter of the lumen. *H Harold Scott*

LINH RES H. Verificação d lepra murina na c d de d Ri d Jan 11 Su d tribuçao geográfi a considerações endemológicas [Murine Leprosy in Rio de Janeiro Geographical Distribution] *Mem Inst Oswald Cruz* 1942 Sept 37 No 3 363-73 {29 ref} English summary

LINH RE H. Contribuição ao estudo d patologia d lepra murina [The Pathology of Murine Leprosy] *M Inst Oswald Cruz* 1942 Dec 37 No 4 543-51 24 figs on 8 pls {73 refs} English summary

HELMINTHIASIS

MUKERJI A K & GHOSH B K. Deterioration of Ascaridol in Oil of *Chenopodium* India: *M d Ga* 1943 Vol 1 78 No 5 234-5

The standards of the British and U.S.A. Pharmacopoeias require that oil of chenopodium should contain not less than 60 per cent w/w of ascaridol and that it should be kept away from the light in a cool place to prevent deterioration of its ascaridol content. Previous

workers are quoted who found that the ascaridol content of various samples of the oil varied from 45 to 70 per cent. The war has made it very difficult to obtain tetrachlorethylene and Mukerji decided to use oil of chenopodium instead but first he tested a sample two years old by the standard B P assay method. In it he found only 49.16 per cent of ascaridol. The authors then tested two other samples recently bought from two different makers. Each was divided into four portions which were put in brown or white bottles, one brown and one white bottle were kept in the light and dark respectively. A table shows the progressive deterioration of the ascaridol content in both samples whether they were kept in the light or the dark at a temperature ranging from 70 to 98 F. The deterioration was more rapid during the first year (1941) than during the subsequent two years.

MAPLESTONE P A. Some Common Helminths of Man. *Med J Australia* 1943 July 10, 2 No 2 25-7 G Lapage

BUFT J C, LANE C M & HAMILTON J L. Report of a Case of Bilharziasis. *J Urology* 1943 July, 50 No 1 68-70 1 fig

Remarking that bilharzia is infrequent in the United States but that United States soldiers may be quartered in districts where it is prevalent and may therefore become infected, the authors record the case of a white missionary, a native of South Africa who had been on leave for 15 months in the United States and developed painless haematuria. There were no other symptoms but eggs of *Schistosoma haematobium* were found in the urine. Cystoscopy showed elevation of the bladder epithelium at three sites, one above the trigone and one on each lateral wall of the bladder. These were surrounded by nodules, one of which had ruptured leaving a small irregular ulcer. The patient was treated with unspecified tartar emetic preparations. The source of the infection was not discovered. The authors remark that the snail hosts do not occur in the United States so that bilharzia cannot spread in that country unless some snail normally occurring in the United States proves capable of becoming an intermediate host, and thus they think is very unlikely. [Cf BLUM and LILCA this *Bulletin* 1943, 40 552] G Lapage

KRAKOWER C, HOFFMAN W A & AXTMAYER J H. Portal Systemic Collateral Veins in the Guinea Pig with Schistosomal Cirrhosis of the Liver and a Discussion of Congestive Splenomegaly. *Arch Pathology* 1943 July, 36 No 1 39-50 2 figs [Refs in footnotes]

The portal systemic collateral veins which develop in the guinea pig experimentally infected with *Schistosoma mansoni* are described. For anatomic and physiologic reasons the view is expressed that in laboratory animals at any rate such anastomoses may be expected to function more efficiently in maintaining lower portal (splenic) venous pressures in the presence of factors leading to portal (splenic) venous hypertension than might be expected in man. To the extent that congestive splenomegaly is related to portal (splenic) venous hypertension the failure to reproduce this condition experimentally is more readily understandable. The importance of these anastomoses in

schistosomiasis is stressed inasmuch as they serve as convenient pathways through which the parasites their pigment and their ova can escape from the portal venous system

FERGUSON M S Development of Eye Flukes of Fishes in the Lenses of Frogs, Turtles, Birds and Mammals — J Parasitology 1943 Apr 29 No 2 136-42 [16 refs]

D. pllostomum flexicaudum is a strigeid trematode found in the intestines of the herring gull in the Lake Michigan region. Its cercariae develop in species of Lymnaeid snails and after leaving these they penetrate fish which are eaten by the gulls. The author found that the cercariae of *D. flexicaudum* obtained from *Lymnaea stagnalis* and *L. palustris* were able to penetrate into and grow into metacercariae in the lenses of the eyes of tadpoles, frogs, turtles, chicks, ducklings, mice, rats, guinea-pigs and rabbits. Attempts to infect one pig and one sheep failed. The metacercariae thus obtained were normal in appearance and behaviour when those obtained from the lenses of a frog and a guinea-pig were injected directly into the duodenum of chicks; they developed in one week in the intestines of the chicks into adult flukes which produced eggs. In the lenses the cercariae cause opacity and sometimes liquefaction of the cortex of the lens; blindness may result. In the eyes of fishes from which the lenses had been removed the cercariae did not survive.

There is probably plenty of opportunity for these cercariae to penetrate the eyes of human beings bathing in the lakes in Wisconsin, Michigan, Minnesota and the surrounding neighbourhood. But the author has found no record of this parasite in human beings although non-strigeid flukes have been reported from the eyes of Europeans [WARD 1918 *Am. Encyc. and Dict. of Ophthalm.* (Wood) Chicago v 12 926] and SALZER 1907 *Arch. A. enl. etc.* v 58 19]. Possibly the eye secretions and the thickness of the eye tissues are effective barriers in man; further cercariae injected into mice and one guinea-pig did not survive nor migrate to the eye nor did large numbers of worms placed under the lower eyelid of mice and one rabbit penetrate the eye. The danger of infection of man is therefore rather remote but cannot be excluded. If the cercariae did enter the lens their presence might not be detected for some time. The author suggests that if the metacercariae died in the lens little trace of them would remain and possibly repair of the lens and return to normal might occur.

G. Lapage

SUMMERS W A & WEINSTEIN P P *D. phyllobothrium* in Florida. *Am. J. Trop. Med.* 1943 May v 23 No 3 363-7
5 figs on 1 pl

Three negro children in Jefferson County, Florida, were found to be infected with *D. phyllobothrium*. A dog belonging to the family of two of these children was also infected. Two of the children were male, aged 4 and 14, and one was a female aged 8. The sanitary conditions of the family which owned the dog to which two of the children belonged were bad and these children were in the habit of catching fish in local streams, cooking them over open fires, sometimes without cleaning them. None of the children or their families had ever been out of Florida State. Florida lies at the extreme south of

the North Temperate zone and *D latum* is not usually regarded as being endemic in this zone. Literature is quoted which suggests that sporadic cases occurring outside the endemic areas are due to the importation of infected fish or to the entry of people who have become infected in endemic areas. The children were treated with oleoresin of aspidium and 22 scolices were recovered from one child, 11 from another. The results of treatment of the third child were not available. The worms recovered are described. It is suggested that the dog may act as a minor reservoir host.

[The recorded hosts of *D latum* include man, the dog, fox, bear, mongoose, cat and various other Felidae, walrus, seal, sea lion and pig.]

G Lapage

MUIRJI A. K. & MAPLESTONE P. A. The Treatment of Taeniasis
Indian Med Ga 1943 June v 78 No 6 282-3

The authors have previously reported 75 per cent of cures among 25 cases of taeniasis treated with carbon tetrachloride [this *Bulletin* 1932 v 29 414]. They now record the results of treatment of more cases making a total of 58 with this drug. One patient harboured *T solium*. All the others were infected with *Taenia saginata* (one worm only except in one patient who passed 2 scolices).

A preliminary purge was not given. The patient had a meal of milk and bread at 7 p.m. the evening before treatment and no more food. Early next morning carbon tetrachloride in doses of 8-48 minims according to age was given [38 cases received the maximum dose of 48 minims (3 cc)]. The only toxic signs noted were drowsiness and giddiness which rapidly disappeared. Most of the patients had the carbon tetrachloride mixed with salts but to nine patients the salts (magnesium or sodium sulphate) were given 1½-2 hours after the carbon tetrachloride. If the whole worm and its scolex were passed and no other strobila was seen the case was regarded as cured. Some cases were followed for five months or longer. If a scolex was not passed the cases were followed up and were pronounced cured if no segments were seen for three months or longer. The subsequent histories of 16 patients were not available. Of the remaining 42, 28 were cured by one treatment. Of the 14 uncured by one treatment seven were given a second treatment and six of these were cured by it. The seventh was not cured even by a third treatment (i.e. by three doses of 48 minims). The general result was a cure in 34 out of 42 cases (i.e. 80 per cent). The maximum dose (3 cc) cured 24 out of 27 cases (89 per cent).

Tetrachlorethylene cured only 54 per cent of a total of 106 cases including 26 previously reported by the authors [this *Bulletin* 1938 v 35 282]. The maximum dose of this drug was 64 minims (4 cc), other doses being given according to the age or undernourishment of the patients. Of the 106 treated 45 did not subsequently report. Of the 61 remaining 30 were cured by one treatment and 10 had a second treatment, three of these being cured by it. The maximum dose of 4 cc cured 30 out of 46 cases. The only toxic sign was dizziness. Two subjects had experimentally induced infections with *T solium*, one of them passed 4 scolices, all the others had *T saginata* and all harboured single worms except one who passed four worms without scolices.

Hexylresorcinol was tried on 25 cases including 10 previously reported by the authors [this *Bulletin* 1933 v 30 205]. This drug was given in hard gelatine capsules early in the morning. No purge was taken on

[December 1943]

(20-40 gm given over five days) will remove some ascarids but not all. The author finds that phenothiazine will remove ascarids from small children with less toxic symptoms than santonin. He was led to try the drug by reading the results of VANSON BAHR's work (this *Bulletin* 1941 v. 38 p. 16). [The author does not refer to similar test with it made by MILLER and ALLEN (this *Bulletin* 1942 v. 39 p. 81).] Diagnosis and examination after treatment were made by means of the author's slight modification of the V.I.H. anal swab [of this *Bulletin* 1942 v. 39 p. 780-81]. All the patients were white people.

The incidence of *Enterobius* infection was studied in three centres in North Carolina. In the first 16 per cent of 274 boys and girls aged 6-16 were positive by one swab only. Since 4-7 negative swabs are necessary to rule out infection this figure of 16 per cent must represent the absolute minimum infection rate. These children came largely from crowded homes and the lower economic levels. The second group examined were high school graduates aged 16-24 years. 115 were examined and only four were infected. The third group consisted of 60 children sleeping in ward close together at an orphanage. 38 per cent were found to be infected after examination of the families about two-thirds of the members of all families in which *Enterobius* was found were infected. The author emphasizes that when *Enterobius* is found in a family all the members must be treated. Three schedules of doses of phenothiazine were devised. Schedule 1 was 8 gm a day for five days (total 40 gm) given to eight adults only. All the patients had nausea and two became dizzy. Five children vomited several times and four took the whole dose. Five years to 7 gm a day for a child of 12 years. All had severe nausea and vomited. All these cases were followed up for ten weeks or more. Cellophane swabs being taken. All the swabs were negative. Five of the patients seen eight months later were still free from symptoms. Schedule 2 was also a five-day course as follows—

TABLE 2—SCHEDULE 2.

Adult Children 8-12 years 4-8 years 2-4 years Under 2 years	Dose in gm	
	Per day	Total
	4	0
	3	15
	1.5	10
	1	7.5
		5

By this schedule 89 patients were treated and 68 showed no toxic symptoms. Eleven had nausea for two or more days, one was so nauseated that the full dose was not taken, one became dizzy, five vomited and in one there was a severe toxic reaction which the author compares with the fatal case reported in the *Lancet* (this *Bulletin* 1942 v. 39 p. 193). See also JOHNSON's case of phenothiazine which was not fatal. In the author's case a white girl aged 14 was given 4 gm of phenothiazine daily for five days. Nausea and vomiting occurred from the fourth to the ninth days. On the sixth day she was pale and had blood in the urine lasting until the 16th day. On the 9th day the mucosae were

pale there were no petechiae or jaundice. The erythrocytes numbered only 1 450 000 while the white blood cells were increased to 31 500. The haemoglobin was 30 per cent and many nucleated red blood cells were present. After transfusion of 75 cc of whole blood and treatment with iron, vitamins and liver the erythrocytes increased to 3 500 000, the white blood cell count fell to 7 800 and the haemoglobin rose to 63 per cent. The patient recovered. Two of her sisters had similar but milder reactions. Of the 89 patients in whose cases schedule 2 was followed 74 per cent were cured by the first course of treatment, 9 per cent were not cured until after a second course and 17 per cent refused a second course. Schedule 3 was as follows —

TABLE 4—SCHEDULE 3

Adults and children over 6 years	
(a) 1 gm a day for 6 days	
(b) Rest 8 days	
(c) 1 gm a day for 6 days	
Children under 1 year	0.25 gm a day for the same period
Children 1-6 years	0.5 gm a day for the same period

No toxic symptoms followed in 62 children and four adults treated in this way. The effects were almost as good as those of schedule 2. The smallest total dose that caused toxic reactions was 20 gm. The author thinks that schedule 3 is an adequate and safe treatment for oxyuriasis and he recommends it for routine treatment. It is he thinks as effective as treatment with gentian violet and far better than any other treatment mentioned in the literature. The chief symptoms of oxyuriasis are stated in their order of frequency as follows: nocturnal restlessness, poor appetite, nightmares, itching at the anus, nervousness, sleep walking, indigestion, bed wetting.

G. Lapage

BERCOVITZ Z, PAGE R C & DE BEER E J. Phenothiazine. Experimental and Clinical Study of Toxicity and Anthelmintic Value. *J Amer Med Ass* 1943 Aug 7, 122 No 15 1006-7.

The authors report on the effects of phenothiazine given orally to human patients and to rats. In 10 rats (with 10 controls) they attempted to produce toxic effects by giving them repeated doses in their food for 18 days until each rat had consumed 390 mgm per kgm rat weight. When the rats were killed no gross pathological lesions were found. Microscopic examination of organs showed no abnormalities except hypoplasia of all the cellular elements in the bone marrow of one rat only and normoblastic hyperplasia of the bone marrow in one other. To 24 human patients 1½ gm of phenothiazine were given three times daily for 10 days until 40 gm had been taken. These patients had long standing diseases (chronic ulcerative colitis, lymphogranuloma inguinale or intestinal infestations with helminths or protozoa). None had acute infection so that the authors conclude that any significant effects on the blood were due to the phenothiazine given. The blood and urine were examined before the drug was given, twice a week during the administration and once or more after it had been stopped.

[December 1943

Tropical Diseases Bulletin [December 1941]

Out of the 24 patients six showed no decrease in the number of erythrocytes 11 showed a decrease up to 500 000 per cmm four showed decrease of from 500 000 to 1 000 000 and three showed decreases of more than 1 000 000. Anisocytosis and poikilocytosis were frequent in the erythrocytes. The haemoglobin level was studied in 23 patients in 11 more than nine the decrease was less than 10 per cent. In 6 the decrease was more than 10 per cent. The appearance of anisocytosis and poikilocytosis was frequent in the erythrocytes.

The effect of phenothiazine on intestinal parasites was studied on 44 patients. The doses for children of 2-6 years were 3 gm twice a day for 10 days (13 gm) for children of 6-12 years the same dose three times a day for 10 days (30 gm) and for adults 13 gm three times a day after a rest of two weeks. For some patients these doses were repeated. Ten patients (children and adults) were treated. The criterion of cure being three negative stool examinations. Many as seven may be required. Two patients were cured after the first dose. The other two were cured after the second dose.

Studies on the Effectiveness of Phenothiazine in Human
Nematode Infections Amer J Trop Med 1943 July, 23
No 4 459-64 [11 refs]

The author records the successful elimination by phenothiazine of *Enterobacter vermicularis* from 22 patients without any toxic effects and from 10 with mild toxic effects in only 10 individuals (haematuria in a girl aged 8 and mild haemolytic anaemia in a man aged 22) both of whom recovered in a day or two.

Phenothiazine of commercial grade was given in syrup in gelatin capsules spread as a sugary paste over crackers (biscuits) or in dissolving tablets. *Enterobacter* infestations were diagnosed and treatment was checked by VHF swabs. In one series of patients these swabs were taken daily for 10 days beginning on the 14th day after the end of treatment with subsequent swabs at about 10-day intervals until two months had elapsed after the cessation of treatment. In the

other series the criteria were the same except that the examination of swabs began one week after the cessation of treatment.

Reporting on the literature the author notes that phenothiazine has been given to more than 200 patients without noteworthy toxicity (haemolytic anaemia or hepatitis) occurred and shows that in all these cases except one the dose given considerably exceeded the dose of about 300 mgm per kgm of body weight which he himself safely and successfully used for 22 of his patients. One of the two patients (a child aged 6 years) who showed the mild toxic effects noted above received 1100 mgm per kgm of body weight. The fatal case of acute haemolytic anaemia noted in the *Lancet* [this *Bulletin* 1942 v 39 193] received according to Most's calculation 410 mgm per kgm of body weight.

The author suggests that the dosage of phenothiazine should be computed on the basis of the patient's body weight and that the total dose given should be the one which he used safely and successfully. Larger doses are not needed and may be toxic. The author's dose of about 300 mgm per kgm of body weight works out at the doses he gave to 22 of his patients namely a total dose of 5 gm for children of 2-5 years a total of 7.5 gm for children of 6-8 years a total of 10 gm for children of 9-13 years and a total of 15 gm for adults. These were successfully given over periods of 3 to 5 days in 22 cases they failed to cure in only three cases two children and an adult but these three were cured by second courses of treatment. The author thinks that the administration of the drug over a period of three days is apparently more effective than when it is given over a longer period.

The author however states his opinion that gentian violet is the drug of choice of *Enterobius* infestations and that phenothiazine should be given only to patients who cannot be cured by gentian violet or who are intolerant of it or in cases in which special clinical investigation is proceeding or which must for any reason be cured quickly. Phenothiazine should not be given to patients who cannot be observed once every three days. Very large doses of phenothiazine have been given without toxic effects but idiosyncrasy occurs.

He also found that phenothiazine had no effect on infestations in the same and in other patients with *Ascaris lumbricoides* *Trichuris trichiura* *Necator americanus* *Strongyloides stercoralis* *Schistosoma mansoni* *Entamoeba histolytica* *E. coli* and *Giardia intestinalis* [It is known that phenothiazine does not act on these species] (G. Lapage)

ELLIOTT M Phenothiazine in the Treatment of Human Intestinal Helminthic Infestations *Trans Roy Soc Trop Med & Hyg* 1943 Sept v 37 No 2 163-4

The author gave phenothiazine to over 70 West African natives and was impressed by the lack of unpleasant sequelae as compared with the results of treatment of 50 patients with santonin oil of chenopodium or carbon tetrachloride. He gave total doses of 20-30 gm spread over 4-5 days without intolerance and says that very poor results are obtained if the whole dose is given in one day. The drug was given in 1 gm tablets. Two of these were given three times a day after meals for 4-5 days. The dose must be strictly controlled especially for children. Results were assessed on examinations begun at least a week after cessation of treatment of simple coverglass preparations made

- SCHNITZER, SIEBENMANN and BRIT *ibid* 862 HUMPHREYS *ibid* 864 and ELLIOTT *ibid* v 40 702
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There appeared to be little or no difference among the three strains used in regard to lethal dose extent of parasitism of the muscles and survival time of the mice experimentally infected (by stomach tube) Thus the variable results recorded in the literature even when they are recorded by the same worker are not likely to be due to variations in the strains of *Trichinella* used

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from the faeces if two successive coverglass preparations showed no eggs the patient was considered to be cured. On this basis cures were obtained in the following infections: *Ancylostoma duodenale* 26 out of 36, *Strongyloides stercoralis* 5 out of 8, *Ascaris lumbricoides* 9 out of 15, *Taenia saginata* 4 out of 8, *Trichostrongylus axei* 5 out of 8, *Enterobius vermiciformis* 6 out of 9. Helminthologists would not consider the technique used to be adequate to check the effects of any drug on nematode infestations. See ELLIOTT this Bulletin 1943, 40 pp 702-3 and the remarks there made. G Lapeere

GRANT L I H A Case of Phenothiazine Poisoning in Sydney Med J Australia 1943 July 10, 2 No 27-9 1 fig

The author emphasizes the danger of the use of phenothiazine for the treatment of Enterobius infections of man.

He describes the case of a girl aged 7½ years admitted for headache, nausea and dizziness with a history of Enterobius infection lasting four months at least which had resisted treatment with santonin and calomel. Immediately after taking a course of treatment with phenothiazine consisting of 2 gm a day of this drug for seven days given in powder three times a day the patient lost appetite, became irritable and suffered from severe headache, tightness in the throat and chest and dizziness. The urine was a port wine colour. On admission to hospital two days after the administration of the last dose of the drug the patient was very pale and slightly jaundiced but there was no enlargement of the liver or spleen and no other abnormality. The erythrocytes numbered 1,810,000 per cmm and showed anisocytosis and poikilocytosis and punctate basophils. There were some nucleated red cells. The haemoglobin value was 40 per cent and the colour index 1.1. The total number of white cells is not given but the differential percentages were: neutrophils 6, lymphocytes 33, monocytes 1, myelocytes 3 and premyelocytes 1 (eosinophils are not mentioned). A transfusion of 400 cc of fresh citrated blood was given by the constant drip method and next day there was general improvement. The erythrocytes now numbered 2,870,000, the haemoglobin was 57 per cent, the white blood cell 14,300 per cmm. Nucleated red cells amounted to 2 per 100 leucocytes and 8 per cent of the red cells were reticulocytes.

No further special treatment was given. General measures included iron therapy and Dover's powder was given as a sedative. Three days later the erythrocytes numbered 2,750,000 per cmm, the haemoglobin value was 60 per cent, the white cells numbered 6,500 per cmm and a differential count gave the following percentages: neutrophils 39, lymphocytes 54, monocytes 1, eosinophils 6. The improvement in the erythrocyte count and haemoglobin continued and eighteen days later there was complete restoration of the blood picture, the parents saying that the child had regained her usual well being.

The author outlines gentian violet therapy, believing that phenothiazine is too dangerous and that the former drug should be used. [He does not however mention the gastro-intestinal disturbances which gentian violet often causes.]

[For other paper on the efficacy and toxicity of phenothiazine see KAUTUNEN EKAUM 1942, 39 192. DAYE and JAMES ibid 861.]

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of larvae given. The author found that the proportion of larvae recovered (by artificial digestion of whole mice) to the number given varied considerably but when the larger doses of larvae were given there was no trend towards an increase in the muscle parasitism; his work supports the view that the size of the dose of larvae has little or no influence on the extent of the muscle parasitism. G. Lapeere

RAPPAPORT I. A Comparison of Three Strains of *Trichinella spiralis* II. Longevity and Sex Ratio of Adults in the Intestine and Rapidity of Larval Development in the Musculature. *Amer. J. Trop. Med.* 1943, Vol. 23, No. 3, 351-62. 2 charts. [37 refs.]

In the same three strains of *Trichinella* the author studied the length of life of adult *Trichinellae* in the intestine (their sex ratio and the rapidity of the larval development in the muscles). His results contradict the generally accepted view that the males are lost soon after the fertilization of the females indicating that males persist after all females have been expelled.

Attention is drawn to the fact that the number of larvae given to the mice was counted directly on a slide and was therefore almost exact. Almost every worm in the intestines of the mice was also counted by the following method. The mice were starved for 6-12 hours and the small intestine was removed, opened and put in 25 cc of saline in a test tube. The caecum and rest of the large intestine were treated similarly in 10 cc of saline. Refrigeration helped the separation of the worms from the mucosa and made the intestine more flaccid for examination piece by piece by compression between two slides and counting, and determination of the sex of worms still attached to the mucosa. Not all of the worms were in the fluid in the test tubes and these were counted and their sex determined individually by removal of portions of this fluid at a time.

The results indicated that there was little difference between the three strains of *Trichinella* as regards their longevity in the intestine and their sex ratio and the rapidity of development of their larvae. Larvae are laid rapidly by the females most of them being laid between the 5th or 6th day after infestation and the 16th day, i.e. in 10-11 days. Counts of larvae digested out of the muscles indicated that most are probably laid in 4-8 days. The author reviews the literature and compares his work with that of others.

With small doses of larvae there was considerable variation in the proportion of larvae recovered to larvae given when doses bordering on the lethal dose (for the lethal dose see RAPPAPORT above) were given. There was more consistency in this and also greater regularity in the longevity of the adults. After the first two weeks the adults were rapidly lost after the first month they were usually absent from the small intestine but they persisted much longer in the large intestine (up to the 34th day after infection). Sex ratios were always in favour of the females until the 16th-18th day (up to the 14th day they were of the order of 1:1.75 to 1:2.45). Typically, about 80 per cent of adults remained in the small intestine until about the 16th day, thereafter the females are apparently expelled rapidly, resulting in a sudden reversal of the sex ratio in many instances this resulted in complete loss of females, males only remaining. This contradicts the generally accepted view that males are lost soon after the females have been fertilized.

LINNFWEH T & HARMSSEN Zur Allergie bei Trichinose [On Allergy in Trichiniasis] *Deut med Woch* 1943 Apr 30 v 69 No 17/18 359-63 [34 refs]

The authors consider that the essential symptoms of trichiniasis are allergic in nature they discuss their reasons for this view in the first part of their paper In the second part they describe the results of skin complement fixation and precipitin tests done on 40 soldiers nine months after the onset of trichiniasis These were done with five antigens prepared in slightly different ways Three of them were made from the trichinosed flesh of rats (one preserved in 0.4 per cent phenol the others free from preservative) and the other two from the trichinosed flesh of pigs (both without phenol) The method of preparation is described All but one of the antigens were dried and made up with normal saline before use to dilutions of 1:500 and 1:10,000 for the skin reactions and 1:2 and 3:10 for the complement fixation reactions

The results indicated that the skin and complement fixation reactions are both useful for diagnosis but that the precipitin reaction is not For large numbers of patients the skin reaction is easiest and quickest the maximal swelling and reddening appears usually in 15-20 minutes and has begun to disappear after 60 minutes Some abnormal reactions among the patients are briefly described Five of the slighter cases showed negative skin and complement fixation reactions when the tests were done 9 months after the onset of the disease but the moderately severe and severe cases were all positive so that antibody had persisted in these for 9 months The authors think that variable results obtained by earlier workers are doubtless due to variability in the constitution of the antigen and that their own work also shows this

The antigens derived from rat muscle were better than those obtained from pig muscle The authors cannot support GAASE's view [*Bulletin of Hygiene* 1943 v 18 210] that pig antigen is better nor his theory that the best results follow the use of antigen from the same species or from a similar species but they point out that one of their pig antigens which was sent to them by Gaase probably was no longer fully active when they used it

G Lapage

DICKEY E S Trichinosis as viewed by Different Interests *J Amer Vet Med Ass* 1943 May v 102 No 794 359-64

This paper is reviewed in *Bulletin of Hygiene* 1943 v 18 p 724

STERN K & DANCEY T E Acute Psychosis associated with Trichiniasis *Canadian Med Ass J* 1943 Mar v 48 No 3 235-7

This paper is reviewed in *Bulletin of Hygiene* 1943 v 18 p 724

DEFICIENCY DISEASES

ANKROD W R Vitamin B₁ Deficiency in Infants *J Ass Med Women in India* 1943 May v 31 No 2 41-6

(1) Infantile beri beri or vitamin B₁ deficiency usually occurs in breast fed infants aged 1-6 months The disease may be of an acute

fulminating type or more chronic in nature. In less acute case the signs are not easy to distinguish from those caused by other forms of malnutrition in infants and by common infantile sickness.

(2) The clinical condition in the infant may be caused by lack of vitamin B₂ in the mother's milk or by a toxic factor in the milk produced by the infant.

(3) The therapeutic test provides the surest method of diagnosis. Two milligrammes of pure vitamin B₂ may be given subcutaneously of machine milled raw rice. She may sometimes but not always herself show signs of beriberi.

(4) The mother's diet is usually one composed almost entirely of machine milled raw rice. She may sometimes but not always herself show signs of beriberi.

(5) It is suggested that doctors and others concerned with the care of infant in India should be on the watch for the condition and observe the effect of giving vitamin B₂ to infants particularly breast fed infant which are not thriving and show clinical signs for which there is no other obvious cause.

Das GUPTA B K. Parenchymatous Keratitis following Riboflavin (Vitamin B₂) Deficiency. *Indian Med Ga* 1943 Apr 1 78
No 4 193-40

After some introductory remarks about riboflavin and induced riboflavin deficiency etc which are not altogether accurate a single case is cited of a 30-year-old Hindu complaining of photophobia and rapid failure of vision of the left eye. On examination the right eye was normal in all respects. The cornea of the left eye was almost totally opaque but no vascularization was noted. Shallow angular stomatitis and slight fissuring of the tongue is said to have been present since at least a normal W R not done. Riboflavin 4 mgm was given daily. The angular stomatitis and tongue condition cleared quickly the cornea after a month. The diagnosis here was parenchymatous keratitis whether associated with riboflavin deficiency and whether influenced by exhalation of riboflavin is another matter.

H S Sivas

VAJIER L E & CHAUDHURI R N. Recurring Pellagra Syndrome in a Myxoedematous Subject. *Indian Med Ga* 1943 Apr 1 78
No 4 193-6 4 figs on 1 pl

The case now reported is of special interest in that there is no evidence either of dietetic deficiency or of any bowel condition that might be associated with malabsorption of nicotinic acid. The condition was not cured by giving a well balanced diet but required niacin in maximal dose. The striking thinness was however that cure could be equally effected by the administration of thyroid extract up to 10 grain daily. Previous attacks of pellagra had been treated with thyroid and nicotinic acid. The last relapse with typical symptoms of pellagra responded to thyroid. The authors conclude. There appears to be strong evidence that cure of the symptoms of pellagra can be effected either by niacin or by thyroid.

H S Sivas

INGELFINGER F J & MOSS R E The Motility of the Small Intestine in Sprue *J Clin Investigation* 1943 May 22 No 3 345-52 4 figs [16 refs]

An abnormal small intestinal pattern has been demonstrated by X ray studies in both tropical and nontropical varieties of sprue but it has been shown that these changes may occur in other chronic deficiency states. In two patients one with tropical the other with non tropical sprue the small intestinal motor activity was studied by means of the balloon kymograph method.

The first had extreme emaciation distension and cramps so that three ileostomy operations had been performed in an effort to relieve these symptoms. When records obtained from the sprue jejunum were compared with the normal striking differences were noted. Whereas the normal upper small intestine prevents the standard balloon from filling with more than 10-30 cc of air under pressures averaging 20 cm of water the bowel in sprue offers less resistance to increases in the volume of the balloon. The lack of intestinal resistance to distension is roughly proportional to the severity of the disease.

In the first case cited pressure of 5-9 cm of water sufficed to inflate the balloon with 70 cc of air but in the second 45 cc of air was maintained by pressure of 10-15 cm of water.

The record of the normal upper small intestine is characterized by large (L) and smaller (S) waves which may be superimposed or occur independently.

When first studied no spontaneous L waves were observed in either case whilst the S waves produced smaller excursions than normal. Treatment over a short period with individual fractions of the vitamin B complex produced little change in the tracings but prolonged administration of the whole complex did cause some improvement in the records. These were hardly commensurate with the clinical results.

On the other hand acetyl beta methylcholine chloride stimulated intestinal motility prostigmine being without effect.

In the first patient posterior pituitary solution adrenal cortical extract and desoxycorticosterone produced no changes.

These observations suggest that in sprue the nervous apparatus of the small intestine fails to liberate active acetylcholine. It should be added that balloon records of intestinal motor activity are significant only if correctly used to interpret changes in the intestinal lumen.

P Manson Bahr

ABICHT I & KUHLMANN F Ueber das Verhalten der Wasserresorption bei der einheimischen Sprue [Water Absorption in Sprue] *Klin Woch* 1943 May 15 v 22 No 20-21 353-6 7 figs

This paper mainly concerns itself with water absorption in sprue. One well marked case in a woman of 50 provides the text and it is quite clear from the description as well as from the bone changes in the illustration that the case is not one of tropical sprue but of idiopathic steatorrhoea.

The arguments are involved and by no means easy to follow. The main evidence rests on the interpretation of X ray examination of the gastro-intestinal tract. The presence of abnormal quantities of fluid

in the bowel : explained by stagnation the result of diminished absorption. It is not due as has been suggested to active inflammatory secretion into the lumen of the bowel. This is the explanation of the evacuated water content of the faeces as well as of the dehydration of the patient.

P. Ma son Bahr

HAEMATOLOGY

IRWELL H C. Dimorphic Anaemia. Deficiency of Iron associated with Nutritional Macrocytic Anaemia. *Trans Roy Soc Trop Med & Hyg* 1943 July 37 No 1 19-40 3 figs [22 ref.]

The classification of tropical anaemias on a simple basis of associated diseases resulted in certain difficulties especially concerning treatment and some of hookworm anaemia improving with iron was therefore made to define the deficiencies present to ascertain what factors in the diet and what concomitant disease might give rise to these deficiencies or might destroy blood or retard its regeneration. Of 134 cases of anaemia classified by mean corpuscular volume and mean corpuscular haemoglobin concentration 27 were found to be macrocytic orthochromic (nutritional macrocytic anaemia) 63 macrocytic hypochromic 27 normocytic hypochromic 5 macrocytic hypochromic orthochromic. The cases in the second and third groups suggested a mixture of nutritional macrocytic and iron deficiency anaemias. Some were severe requiring treatment both by iron and liver which given serially induced a double reticulocyte response in others one deficiency predominated and the cases recovered albeit slowly when the major deficiency was corrected. For these dual deficiency anaemias the name dimorphic anaemia is suggested since in such cases the peripheral blood shows two types of cell the marrow a mixed type of erythropoiesis and two dietetic factors are concerned in the aetiology and treatment.

This paper is the first of the author's series on the same subject but owing to delays in communications was not the first published. See this B. J. in 1943 1 40 329-494.]

F. M. Gatford

VENOMS AND ANTIVENES

PENNA SOBRINHO O. Anaveneno e o seu valor na produção de soros anti-ofídicos. Anavenin for the Production of Antivenenes. *Bol Inst Med* 1943 June 26 1 5 Nos 25 & 26 272-3. English summary (3 lines).

In 1936 the Ezequiel Dias Biological Institute started preparing antivenenes using a stock venene consisting of venom 10 gm glycine 80 cc physiological saline 100 cc. The venom was a mixture of *Bothrops jararaca* 6 gm *B. asclepias* *B. r. r.* and *B. a. a.* each 1 gm. For diluting Crotalus stock

venom NaCl 1.5 per cent was used. For preparing the antivenene horses were injected subcutaneously twice a week with gradually increasing doses starting with 0.075 mgm and increasing till at the twenty fifth inoculation 350 mgm was the dose. The Bothrops antivenene was quite satisfactory that against *Crotalus* was not so the injections were continued thirteen more being given and the final dose was 1.000 mgm.

The decision was then made to test the value of anavenin for immunizing horses. For making this a mixture of titrated venom 13.3 gm glycerin 333.3 cc formol 13.3 cc saline to 1.000 cc was kept at 37 C for 40 days then filtered. A horse was inoculated with this subcutaneously starting with 0.005 mgm and at intervals of 3-4 days at first later a week till at the forty second inoculation after eight months 0.45 mgm was used. This was slightly modified later. Thus for anti *Crotalus* serum anavenin of 10 gm of venom 330 cc glycerin and 10 cc of formol was used and the period of immunization shortened by eight weeks. An antiserum was obtained of which 1 cc neutralized 1.000 mld for a pigeon. For anti *Bothrops* serum this method is not necessary and shows no advantage as the ordinary one is quite satisfactory except that during the immunizing abscesses are common complications they are usually sterile and are just as frequent when anavenin is used.

H Harold Scott

MARTINS A V Anaveneno escorpionico [Scorpion Anavenene]
Brasil Medico 1943 June 5-12 v 57 Nos 23-24 248-51
English summary

It is possible to reduce in a great extent the toxicity of scorpion venom solutions by adding 1 per cent formol and keeping in the ice box at 4 C for approximately 40 days without affecting its antigenic value. The anavenom so prepared can be used with great advantages in the preparation of the antiscorpionic serum.

BEASLEY B T Arachnidism Case Report of Arachnidism with
Death and Autopsy Finding *Southern Surgeon* 1942 Oct v 11
No 10 737-41 [39 refs]

A boy aged 16 years was admitted to hospital at midnight and died next day at 8.50 a.m. He complained of vomiting and thirst pains in the legs and intense abdominal pain. On admission he was pale with moderate cyanosis of the lips and finger tips restless and semicomatose. The abdomen was rigid but not tender. A blood count showed 35,100 leucocytes per cmm of which 81 per cent were neutrophils. His temperature was 100 F. A specimen of urine was not obtained. He was given an injection of morphia (gr 1/4) and atropine (gr 1/150) and 1,000 cc of normal saline containing 2.5 per cent glucose subcutaneously. His temperature rose to 106.5 F and at 8 a.m. he had a convulsion lasting 2 or 3 minutes.

Post mortem examination showed no naked eye pathological appearances. Sections of the kidney showed swelling of the epithelial cells of the tubules and extravasation of erythrocytes. The cerebrospinal fluid taken at autopsy by cisternal puncture contained 210 cells per cmm mostly lymphocytes.

and the ends of each are tied over a rubber rod laid on the lid surface so as to cause eversion of the edge of the lid. To support the tarsus during the incision and to keep the lid stretched and everted Berkley uses a Desmarres clamp from which the ring blade has been removed. A suture is passed through the centre of the lid margin the lid is everted over the remaining blade of the clamp and is held stretched in position by tying the ends of the suture round the setting screw of the instrument.

Cataract—O BRIEN⁷ advocates the use of a wide angle keratome and scissors instead of a Graefe knife in making the section for the extraction of a senile cataract. He claims that the keratome incision is easier to make and results in less astigmatism despite the use of scissors. The scissors cut should be planned to cause a wider wound than is usual with a Graefe knife. (It may prove difficult to ensure an even cut with scissors through the corneo scleral tissue and some irregularity of the wound is likely to result. This however is often less injurious than might be expected.)
H Kirkpatrick

MISCELLANEOUS

WAR MEDICINE Chicago 1943 May & June v 3 Nos 3 and 4
484-97 619-34 1 chart Development of a Medical Service for
Airline Operations in Africa [Medical Department Pan American
 Airways—Africa Ltd.]

This paper records the 14 months experience of the medical department of a major airline running from Bathurst West Africa down the coast to Lagos a distance of 1731 miles thence across the continent to Khartoum and Cairo a total distance of 4892 miles. About a quarter of the line was over the semi jungle of the coast while inland it traversed more elevated and drier terrain until in the Sudan and Egypt real desert conditions were encountered. Stations were located at intervals of approximately 500 to 700 miles. On the coast temperatures rarely exceeded 90 F but the humidity was high the average being 80 per cent although in parts it did not fall below 90 per cent for four months at a time. In the desert variations of temperature were greater the average maximum being 110 to 115 F but in the Persian Gulf it sometimes reached 127 F. Minimal temperatures in the desert were sometimes as low as 40 F and diurnal variations of 60 to 90 F were frequent. Rainfall in parts of the coastal belt reached 200 inches per annum in others only 30 inches and in the desert even less. The rainy season commenced in May, reached a peak in June and subsided in July with a secondary peak in September.

Applicants for employment were given a complete medical examination including urine analysis, blood counts, serological tests and X ray examination of the lungs. Of 1855 persons examined 294 (16.1 per cent) were rejected, cardiovascular diseases accounting for 20.3 per cent of the rejections, visual defects for 12.4 per cent, genito-urinary diseases for 11.1 per cent and respiratory diseases for 10.1 per cent.

O BRIEN C S Comparison of the Keratome Scissors and Graefe Knife
Incisions for Cataract Extractions *Am J Ophthalmol* 1943 May v 26
No 5 508-10
(118)

Tropical Diseases Bulletin [December 1941]

demonstrate the e bodies in 15 per cent of old r children suffering from the disease and in about one third of the apparently healthy
examined 156 Algerian in La Houat and found trachoma in
12 per cent of the with five labodes whereas only 31 per cent of the
normal were infected some group of the fatt r r accu tomed to the
tre in the bazaar and cantonments during winter and spring and
a u h the incidence was higher The infection sta e of the
h t hieffly affe t the juvenile portion of the population three
l t r are attack d befor reaching the a of five and nearly 90 per
l t before the a of 10 Intropia and trichiasis were found present
in n rly 6 per cent of trachomatous patient the incidence in females
l i twice a hi h a in male Pterygium i much more common
m n th nomad than among tho with fixed habitations and in
th owing to th comparatively r ter expo ure to the influence
f lot an l h u ty win ls the m id n e i h er in mal s than in females
MIRION and BEATIF⁵ have de scribed their method of expo in the
p per for in to dem u tr te the pre eu e of granu After ever ion
l the upper lid the thumb i placed behind the everted tarsus which
then stret hed on the thumb nail (Study of chan es in the upper
t m x may be g e rly f i l itated by the subconjunctival injection of
l of i vocaine lution at the upper ed e of the tarsal plate The
p o l u re e rables one to recognize early fibrotic and other pathological
ha i in the conjunctiva and renders ea v the tho o h application
f r medi The author hi tologically examined 13 tarsi and 6
la h ymal sa t e oved from pati nt utteri from trachoma in
Ma Calla t e ill nd iv Generaliz d thi ken u of the sac wall
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i sa The conjunctival ind tar al chan es not d corre pond with
the find by inot ther obse rers Chan es in the Meibomian
gland seem it oc i r ually in their di t No Halberstaedter
f rowazek bodi and n Rickett ia v r dete d i th se ti ns
BLAKLEY⁶ ec mm d an operation for e tropion and trichiasis in
whi h the tar u i d ded i v n i c i s on th o l i t conjun t i a l
i fa e The lid is everted and stretched on a blade of a Desmarres
lanj and a local a nesthet c i injected subconjunctivally special
attention be n pait the in le of the fornix A horizontal inc sion
on entric v ith the lid border and 3 mm distant from the lid ed e is
made through the conjunctiva and the whole thi kn e s of the tarsal
plate care is taken to divide completely the tarsus in its entire
width The cut ed es of the tarsus are then tnd rmined on either sid
of the wound o as to fee it from muscle attachments One needle of
a doubl arm d alk suture is next passed through conjunctiva and
tarsus at a point 1 mm behind the centre of the proximal or upper
lip of the wound and is brought out through the cut surface of the
tarsus It is then passed throu h the cut surface of the di tal tarsal
sement and out throu h the skm just behind the line of the culia The
second needle i passed th ough conjunctiva tarsus muscle and skm
at a point behind and 2 mm lateral to the site of entry of the first
Four similar mattr suture are pas ed two on either sid of the fir t

I c R Let t h m h les d d t r
t t t q A h i t P t d d t r
V t r o R E R A h i t P t d d t r
Indu I R A h i t P t d d t r
R E R A h i t P t d d t r

I c R Le t h m h les d d t n d La h t Et d
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 V tto R E R & BEATT E V H d Alge 1940 Dec 18 N 4 477 91
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 1943 W y 41 N 3 779-36

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[December 1943]

the age limit for service was set at 18-45 years and most of the subjects were below 30. After acceptance each employee was inoculated with yellow fever, the enteric fevers, tetanus and cholera. A helmet and a supply of quinine and mosquito boots or repellent was provided and that the maximum period of tropical service should not exceed 15 months and that a history of repeated attacks of venereal disease or peptic ulcer should exclude a man from acceptance. Of the 37 returned for medical reason and accommodation was set at 10 per cent of the personnel but owing to the careful selection of the staff and the control of malaria and gastrointestinal diseases 1 per cent sufficed. It was suggested therefore that in a combatant area 3 per cent should be ample provided preventive measures are aggressively applied. It was found that one medical officer could care for 600 men but at each station it was necessary to have a medical officer regardless of the number of the staff. A dental officer was a necessity and specialist in ophthalmology, nose, throat and ear work were also desirable. Highly trained laboratory technicians, adequately trained for work in the tropics, were essential and a medical entomologist. A carefully planned laboratory, a dental department and a laundry from the military forces furnished by medical authorities. Figures from the military forces traversed by the airline indicated that the malaria attack rate in West Africa must be 100 per cent per year for a minimum of some 200 per cent in fact during the first few weeks when the airline was being hurriedly established—it was operated in Africa within 60 days of the decision to establish it having been taken in Africa. A considerable outbreak of malaria did occur in 46 out of 254 men suffering acute attack within seven weeks by 800 men from 1st October to 26th May 1941. After anti-malaria measures were established the incidence of the disease fell rapidly and cases failed to reappear during the peak of the malaria season in September 1941. There was only one case among 1,400 men and 10 per cent during eight months of the year. The measures adopted were as follows. Each man was provided with an adequate mosquito net. In addition all quarters and accommodation were screened with 19-mesh screen and at each station a maintenance man was provided whose sole duty was to inspect and keep the screens in order. Entrances to buildings were kept at a minimum mosquito vestibule traps of adequate length were provided and all door had automatic spring closing devices. Quarter were sprayed once or twice daily with DDT. Quarters were also sprayed for the purpose and adjacent breeding areas were carried out as well as schemes of drainage at all sites a maintenance group was constantly available to correct faults and to prevent potholes from forming. Quinine and atabrin were used for personal prophylactic treatment. Routine blood films were examined of all members of crews immediately before a flight and of

3 200 smears taken in a year 35 were found positive for malaria the value of so examining aviators and of grounding and treating such as were positive was shown by the fact that men with positive smears in practically every instance developed clinical attacks of malaria within 24 to 48 hours Long sleeved shirts long trousers and mosquito boots were provided for evening wear Native quarters were segregated Various methods of treatment of malaria were tried but there seemed little to choose between them and a final routine was adopted of quinine sulphate 30 grains daily for two days followed by atebain 0.3 gm daily for five days pamaquin was not used and the relapse rate did not seem unfavourably influenced by its omission Practically all the malaria was due to *P falciparum*

Although clinically not serious the diarrhoeas ranked next to malaria in importance Of 600 admissions to the main hospital in eight months 157 were due to gastro-intestinal diseases of all sorts and of these 52 occurred in one night from food poisoning whereas at a large base in the Sudan before adequate sanitary measures were introduced 20 per cent of the staff contracted diarrhoea one or more times a month at one station in Nigeria the rate dropped from 30 per cent to 0 in one day when properly sanitized quarters and kitchens and flush toilets were installed Repeated and periodic examination of native food handlers is important since on the basis of 600 stool examinations 28 per cent of the native population were found to harbour *E histolytica* Exclusion of flies from messes and latrines by screening was the most important single factor in the prevention of dysentery

Infections of the upper respiratory tract were common of 228 persons confined to quarters during a five month period 97 had such infections Fungous infections of the skin were frequent Psychiatric problems were minimal but all persons were volunteers living conditions were comfortable and the food was unusually good There were no special surgical complications among the white persons sepsis was no more common than in temperate zones and there were no unusual anaesthetic problems air conditioning of operating theatres was invaluable At Accra where the largest hospital was situated the average daily hospital census from May to December 1942 was 18 the minimum for any month was 9.3 in June and the highest was 25 in November which was equivalent to 1 per cent there being 2 500 men in the camp During the period covered by the report there were eight deaths and only one of these was due to disease namely peritonitis following intestinal obstruction The company drew up a series of health rules and held every man responsible for abiding by them There was no evidence to indicate that climate *per se* had any deleterious effect on health and it was the unqualified opinion of the medical staff that good health can be maintained in the tropics despite maximum disease hazard provided preventive measures are aggressively applied

F Murgatroyd

WRIGHT A A Vomiting Sickness in Jamaica [Memoranda] *Brit Med J* 1943 Sept 2: 392

The contributor of this note gives brief accounts of two children attacked by the so-called Vomiting Sickness of Jamaica One a boy of 12 years recovered rapidly the other a boy of seven years died in a few hours [This is the usual history in cases of this disease but the comments of the author are to say the least non sequential The

reviewer has repeatedly pointed out the unsuitability of the name Vitamin Sickness. It is never safe and often misleading to name a disease from one prominent symptom. Dr Wright mentions a case of poisoning among other causes or possible causes and of course there is no need to stress that there are several other causes of vomiting and even a fatal disease with vomiting in all countries tropical and non tropical. I did not limit the name to one disease, no more logical than to call a cerebral tumour or meningitis headache disease. If however the minute disease which has gone popularly by this name in Jamaica for more than half a century is separated from others of which this is a symptom it is better called a local poisoning. Had the writer studied the many publications on the subject he would not have committed himself to statements such as "Children eat even the uncooked fruit a local poisoning without any untoward result, or that the causation includes lack of nutritional and vitamin requirements exposure to (and lack of) sudden variations in temperature or again the local authorities have done little if anything to probe the cause. We would like to say a few words on each of these as much danger lies in refusing to recognize the risks of eating ackees under certain conditions.

The reason why any untoward results should follow eating of the fruit cooked or uncooked provided it is ripe and mature. Nearly 40 years ago SCOTT showed the conditions under which it might be eaten with impunity. Secondly, Lack of nutrition and vitamins. I and dead in twelve hours from lack of vitamins? Or if recovery is quite well again in a day or so without any change from ordinary diet? Thirdly, exposure to sudden variations in temperature. Jamaica is not subject to great sudden variation in temperature certainly between say 9 a.m. and 6 p.m. and during that time patients may be attacked and die. Lastly, the local authorities have done little if anything to probe the cause. Apart from the special investigators brought from England by the Jamaica Government and paid for by it namely T. J. POTTER from London in 1910 and H. SPIDELIN from Liverpool in 1912 each of whom published full reports of his investigations we need only mention the following: A. MCCARTY in 1886, R. G. S. BELL in 1900, H. G. TILMAN, COOKE, A. THOMSON, G. W. THOMSON, R. S. TILMAN who all wrote on the epidemiological and clinical aspects. SCOTT from the epidemiological and laboratory work of A. CONNELL and W. RALSTON the full report of E. O. JORDAN and W. BIRROW and the admirable experimental work of LEITCH, GILLES and ARNOLD. If the writer of the note will read these he will be sure no longer maintain that the local authorities have done little to probe the cause.

H. Ha old S off

DE FICLIREDO J. Tratamento das úlceras tropicais pelo vapor de iodo nascente. *Treatment of Tropical Ulcer by Iodine Vapour*. Folha 11 d 1943. May 24 No 9 81-3

Reviewing the subject the author notes how common ulcers are in the tropics and how many are the remedies proposed and divides the latter into three groups. (1) Directed against the local infection—arsenicals, vaccines, pyretotherapy and surgical as perianterial symphysectomy. (2) Against intercurrent for rather basal concomitant.

disease syphilis helminthiasis malaria for example (3) Directed to improve the general health iron strychnine vitamins He then describes his method of applying daily nascent iodine vapour after cleansing the site with cotton wool soaked in saline He spreads on a thick layer of iodoform and by rapid passage of thermocautery liberates the iodine and then covers with a simple gauze dressing. Another method is by means of an ordinary vaporizer with a rubber bulb

He quotes briefly ten cases in one an ulcer of three months standing had cicatrized after ten applications in another one of five months after eight applications in a third one of 6 months after nine applications He suggests the mode of action to be that the nascent iodine on coming into contact with the albuminoid serous secretion of the ulcerated issues forms a special organic combination which is gradually absorbed and renders conditions unsuitable for the growth of pathogenic organisms at the same time raising the defensive power and stimulating the cells to repair

Dr M N Cancerum Oris and Allied Conditions Indian M d Ga
1943 May 1 79 No 5 245-7 1 fig
H Harold Scott

Noma is in text books of medicine mostly noted as a complication of the infective fevers in children and its existence in tropical conditions is ignored [It is mentioned however in Price's Text book] As the author points out it is by no means uncommon in kala azar and the leishmaniasis and in conditions with splenomegaly because there is marked depression of leucopoiesis particularly of granulopoiesis and blockage of the cells of the reticulo endothelial system or a marked inhibition of their antibody forming function Both these factors are found to work together in leishmaniasis The result is that any infective process in the body however trifling it may be rapidly progresses and may cause gangrene The result

The author refers to cases of splenomegaly characterized by chronicity development of anaemia leucopenia with little or no fever The gangrene may affect other sites than the mouth though commonest there because of minor traumas pyorrhoea and gingivitis It may involve the cervix uteri the caecum the lung and external genitalia The author calls these noma of the caecum noma of the lungs and noma pudendi [The alternative names he gives cancerum intestinalis cancerum pulmonalis are solecisms which cannot be allowed to remain] Gangrene of the male genitalia has not been previously reported in the literature the author now records a case in a man of 32 years with kala azar and noma scroti Rapid improvement followed the use of urea stibamine
H Harold Scott

JOHNSON, A S The Pathogenesis of Hepatic Cirrhosis Indian Med
Ga 1943 May 1 78 No 5 227-32 1 map

The author describes briefly the diet and habits of the people living in different parts of Travancore Hepatic cirrhosis has greatest prevalence in the Kottayam area He then goes on to discuss the reasons for this prevalence and concludes that the cirrhosis can be ascribed to toxins present in their staple food tapioca [The whole article is rather an arm chair discussion and a little positive direct evidence would carry more weight than the many suggestions probabilities and possibilities which are put forward So many things are thought by

the author to play a part he considers diabetes schizophrenia splenic anaemia degeneration of the lenticular nucleus manure poisoning malaria alcoholism and others all in four pages. In parts where the tapioca is used but cirrhosis is not common vitamin D tubercle is added. Alcohol he maintains does not produce allowing absorption of poisons. Neurasthenia and flushing indicate the onset of cirrhotic change in the liver. This may be the action of toxins liberating histamine as they are being subjected to the action of toxins. The discussion indicates that the author has a wide field for research open to him and the following up of some of his urms may throw much needed light on this difficult subject.

KELLNER F. *Fluchtiges Lungeninfiltrat — eosinophile Pneumonie Transient Infiltration of the Lungs — Eosinophil Pneumonia Munch med Woch 1943 Apr 23 v 90 No 16 17 28-8*

This is not a discussion of the condition itself but of the correctness of the terms used. The author traces the history of our knowledge of the disease from the time when after the first war cases of infiltrative disease of the lung began to be met with in increasing numbers. Some ten years ago the presence of eosinophilia was observed as a common accompaniment of the lung condition and the term infiltration with eosinophilia was applied to it. Next the word infiltration was inevitably associated with tuberculosis and when this organism was not found the adjective non specific was added. Eosinophilia is common to many diseases and in this condition subject to much variation hence neither eosinophilic nor infiltration was altogether satisfactory. Yet further inflammation of the lung to many perhaps most physicians implied pneumonia and the very transitoriness of the condition ruled this out although the infiltration was both intra and inter alveolar. The idea that this might be due to the passage of larval Ascaris was mooted but though the author accounts for some cases it certainly left many unexplained. The author maintains that the term infiltration should be reserved for tuberculous lesions on the other hand the condition he says but to a large extent the same as eosinophil pneumonia to it he says premature. He seems to favour the view of von MEYENBURG that this transient infiltration is allergic in nature and the eosinophilia when present supports the idea. [This article, an interesting review of the question in spite of the fact that no very tangible conclusion is reached see also the B M J 1943 v 40 pp 790-791]

H Ha old Scott

MIRAZ G. *Koumra (Afrique Equatoriale Française) et ses 80 pour 100 d'ortreux. Koumra and its 80 per cent of Goltrous Inhabitants. P ss Med 1943 June '6 v 31 No 24 349-50*

Referring to a recent paper by Robert DUFOUR (La Presse Méd 1941 Jan Nos 5-6) on ortre in Koumra in the Vidlle Charar of French Equatorial Africa the author points out that the disease in this area was first studied in 1917 by BOUILLEZ who led directing measures

against sleeping sickness. The author who succeeded Bouillez again investigated the problem of the frequency of goitre in this area in 1922. It affected the population of the Iaterite [iron stone] plateau who got their water from deep wells while the riverine people were free from the disease. The latter however were infected with sleeping sickness while the people of the plateau escaped this disease and the author was faced with the problem of how to deal with these two populations as neither could safely be transferred to the other area. He advised the distribution of iodized salt but transport difficulties prevented the plan from being carried out. Finally, this he considers that surgical removal of nodular goitres now being done by DUPONT for the first time in this region is a valuable measure which will attract many sick people to the hospital and add to the renown of French science.

J. I. Corson

CIMMINO V. Studio sulla velocità di sedimentazione in Eritrea. Nota 1—Considerazioni generali—Valori normali. [Blood Sedimentation Rate in Eritrea, Normal Values] *Boll d Soc Italiana di Med e Igiene Trop* (Ser Eritrea) Asmara 1943 v. 2 No 2 10-16 [21 refs] English summary

The author studies the speed of sedimentation in the more common diseases of Eritrea starting the work with research on healthy subjects either European or Native. After having summarised the various methods used for this test and the various cause which can influence the speed he describes the macromethod used by him viz that of KAUFMANN. He reports the normal values obtained by this method.

Once more he calls the attention of the student to the importance which various factors may assume in the estimation of this interesting biological phenomenon which is still worth further study and needs greater accuracy.

CIMMINO V. Studio sulla velocità di sedimentazione in Eritrea. Nota 2 La V di S nella tubercolosi polmonare e nella lues. *Boll d Soc Italiana di Med e Igiene Trop* (Ser Eritrea) Asmara 1943 v. 2 No 2 55-63 [14 refs] Nota 3 La V di S nel tifo esantematico. *Ibid* 64-70. Nota 4 La velocità di sedimentazione nella malaria. *Ibid* 71-7. Nota 5 La velocità di sedimentazione nella febbre ricorrente. [The Blood Sedimentations in Various Diseases of the Natives of Eritrea] *Ibid* 76-82. English summaries

1 Pulmonary tuberculosis in Europeans living in the Eritrean high land modifies the speed of sedimentation in just the same proportion as that described in Europe (it is generally increased in the active forms and vice versa)

2 Pulmonary tuberculosis in natives is very often accompanied and in our cases was always accompanied by a great increase in the speed of sedimentation thus confirming the acute tendency of the tubercular process in such patients

3 Active untreated syphilis in Eritrean natives constantly accelerates the speed of sedimentation

4 Syphilis in natives resistant to treatment is not accompanied by any slowing of the speed of sedimentation on the contrary in general the speed is accelerated as in untreated syphilis

diagnosed at necropsy by the discovery of the parasite. The children all died during infancy in the acute or subacute stage of the infection. The outstanding features were the occurrence of striking ocular lesions associated with neurological symptoms and signs. The ocular lesions consisted of multiple focal bilateral areas of chorio retinitis in most cases involving the macula with less constant microphthalmos, nystagmus and ocular palsies. The neurological signs included convulsions, hydrocephalus and most strikingly multiple foci of intra cerebral calcification. On the basis of the nine fatal cases it was possible to construct a picture which enabled six cases to be diagnosed clinically. These were in older children all alive at the time of writing in whom the duration of the disease was from 14 months to 8 years showing that the infection is not uniformly fatal and that it may become chronic, healed or latent. In these older children the outstanding symptom is usually diminution in vision due to the effect of the multiple foci of healed chorio retinitis, strabismus, microphthalmos and minor congenital ocular defects may also be present. Generalized convulsions or petit mal attacks may persist or make their appearance. Internal hydrocephalus may become chronic and progressive. Foci of intracerebral calcification persists and may increase in number and size. Retardation in the development of speech and minor degrees of mental deficiency occur. It would seem that in all these cases the infection is contracted before birth and that the form of disease should be regarded as infantile or congenital. In other cases toxoplasmosis is not acquired till the juvenile or adult period of life is reached. In such cases the infection is termed juvenile or adult acquired toxoplasmosis.

It is evident that congenital toxoplasmosis is not a rare disease and it is believed that many cases have been erroneously regarded as instances of congenital malformation of the brain, cerebral birth injury, epilepsy, congenital hydrocephalus etc. The identification of other cases of the disease which is evidently widespread in the United States may yield some information as to its epidemiology.

C. M. Henyon

BOOK REVIEWS

CAMBOURNAC Francisco Jo e C. *Sobre a epidemiologia do sezonismo em Portugal* [On the Epidemiology of Malaria in Portugal]—237 pp. With 44 graphs. 1942. Lisbon. Socied de Industrial de Tipografia. Lda. R. Almirante Pessanha 5.

This is a very detailed account of the epidemiology of malaria in Portugal and is admirably documented. The geographical distribution of the disease in the country and the factors responsible for that patchy distribution are discussed at length. The chapter dealing with the Anopheles of Portugal *A. nigripes*, *A. claviger* and *A. maculipennis* var. *typicus* and *atroparius* is very complete. *A. maculipennis* var. *atroparius* is by far the most important vector of malaria in Portugal.

The author is pre-eminently well qualified for the task he has so successfully accomplished. Work in the anti-malaria stations in

Benavente and Alcantara do Sol was followed by many years collaboration with Rolla B. HILL in the comprehensive investigations that were sponsored by the General Directorate of Public Health of Portugal and the International Health Division of the Rockefeller Foundation. In 1938 the intervention of the Rockefeller Foundation culminated in the creation of the Malariological Institute at Águia de Moura which is the centre of malaria studies for the whole country. Dr Cambrournac became the Director of the Institute.

Most of the author's most important observations regarding the biology of *Anopheles* in various parts of Portugal and the association of malaria with rice cultivation have previously been published in medical journals and have been summarized from time to time in this *Bulletin*. Their re-statement and expansion in this very complete study of the epidemiology of malaria in Portugal constitute a noteworthy addition to malaria literature.

Veritas 11/44

CLAVEPO DEL CASPO G. [Director del Instituto Nacional de Sanidad] & PEREZ GALLARDO F. [Médico de Sanidad Nacional] Técnicas de laboratorio en el tifus exantemático. Prologo del Prof. Dr. J. A. PALANCA. [Laboratory Technique in Typhus Exanthematicus]. —18. pp. With 104 figs. (coloured). 1943. Madrid: Imprenta la Prensa Española S. A. Serrano 61.

A book by the same author on louse-borne typhus fever has already been reviewed (*this Bulletin* v. 40 p. 311). The present small volume of 188 pages deserves equal commendation.

All the more important methods employed in the investigation of louse-borne and flea-borne typhus are clearly described and instructions are given for the preparation of killed vaccines. Special attention has been paid to the pitfalls and fallacies connected with the various procedures. There are 104 illustrations of which seven are coloured; these have been carefully prepared for the book; they are exceptionally clear and self-explanatory so that they will be found very helpful by all who undertake laboratory investigation into the Rickettsial fever.

The author deals with methods of which they have had personal experience and therefore there are certain omissions such as the preparation of living vaccines and the technique of the complement fixation test. The methods of isolation and cultivation, Rickettsiae by guinea-pig inoculation, intrarectal inoculation of lice and cell-culture cultures occupy about 80 pages. Murine Rickettsiae are dealt with in a further section of 25 pages though these are said never to have been isolated in natural condition in Spain. The Weil-Felix and Rickettsia agglutination reactions are described but no comment is made regarding their relative merit. The description of the latter reaction is based on the use of Rickettsial suspensions prepared from laboratory infected lice. Giroud serum protection test is well described.

The rest of the book deals with the preparation of vaccines by Weigl, Cox and Durand and Giroud methods, all of which are described in detail and with a wealth of illustration.

Some workers will think that undue attention has been paid to Weigl's vaccine which the authors obviously regard as having special advantages over the other. There must be few who can contemplate

undertaking the elaborate louse husbandry procedures involved in the preparation of Weigl's vaccine

Nothing is said about the risks run by the personnel engaged in the preparation of vaccines

The authors state that the Weil Felix reaction rapidly became negative after attacks in the recent Spanish epidemic. Titres higher than 1-25 to 1-50 two months after attacks were of rare occurrence

Kudicke and Steuer's dry blood agglutination test is praised but it is said that positive results can be expected only when the Weil Felix titre is higher than 1-200

In the opinion of the authors the egg yolk and rodent lung vaccines have not yet been proved to be effective for human beings their dosage has not yet been established doses suitable for guinea-pigs are not necessarily adequate for human being In this matter the authors express doubts which must have occurred to many others but the same misgivings apply also to Weigl's vaccine and if much larger doses are found to be necessary the cost of this will be prohibitive

The Director General of Public Health Prof PALANCA has written a prologue in which he gives an interesting account of the work of his department during the recent epidemic He mentions that the book was prepared on his initiative and published at the expense of the Health Department

John H D Megaw

SHATTUCK (George Cheever) [M D] & MIXTER (William Jason) [M D] *Handbook of Health for Overseas Service* pp vii+228 With 15 figs Second Edition Revised 1943 Cambridge Mass Harvard University Press

As stated in the preface this second edition has been extensively revised and new material has been added It is intended for the use of persons who may be in places where hygienic conditions are primitive and medical help at times unobtainable and it admirably fulfils that purpose The chapters include general directions for personal hygiene and sensible living and an account of common ailments and medical and surgical affections—including the more important tropical diseases Directions for the use of sulphonamide compounds are given with a warning of the risks involved There is a short chapter on the maintenance of health in arctic climates The chapter on surgery deals with the commoner surgical emergencies including such recently important conditions as immersion foot and lifeboat foot A short chapter on miscellaneous medical information contains directions for the use of a thermometer hypodermic and antitoxin syringes and the more important drugs

The book is of pocket size and well printed with water resisting ink on water resisting paper It can be strongly recommended to those for whose use it was written

J F Corson

STRONG (Richard P) [M D Sc D D S M C B Professor of Tropical Medicine Emeritus Harvard University etc] *Stiff's Diagnosis Prevention and Treatment of Tropical Diseases* Sixth Edition in 2 Volumes Vol I pp vi+1-871+vi Vol II pp vii+872-1747+vi With 398 figs & 4 plates (2 coloured) Reprint with additions 1943 Philadelphia The Blakiston Company [Price £5 5s]

As predicted the demand for the Sixth Edition [this *Bulletin* 1942 Vol 39 p 352] has rapidly exhausted the issue so that a reprint has

become necessary. The pamphlet remains as before but here and there additional paragraphs and alphabetically numbered supplementary notes have been wedged in to accommodate recent information.

In treatment of leishmaniasis stilbamidine finds a place in yellow fever there is a considerable addendum and also in trench fever and sprue. It is rather unfortunate that on p. 1332 it is suggested that *the chetria nala* might be identical with the Pacific variety of *the microphi*.

The confidence of the profession in this excellent book is reflected in this up-to-date reprint which has been effected in such a short space of time.

Various J. S. A. LITERATURE. H. G. The Anopheline Mosquitoes of the Northern Half of the Western Hemisphere and of the Philippine Islands (Distribution Habits Identification Importance as Vectors and Control). *Tr. J. Med. Bull.* No. 59 (Special Issue) 1942. Jan. 213 pp. 5 pls. 2 charts. [19 pages of refs.] Pennsylvania Medical Field Service School Carlisle Barracks.

The authors purpose has been to gather into one small volume facts on the *Anophelis* mosquitoes of the rather heterogeneous regions defined in the title. The book is for the use of military medical men and entomologists in the U.S. Army Sanitary Corps.

The authors deal successively with three areas: North America, Tropical America and the Philippine Islands. For each they give keys for adult mosquito of both sexes and for larvae. These are followed by short notes on geographical distribution biology and relation to malaria of each species. The evidence on relation to malaria is tabulated fully.

There is a rather brief chapter on malaria survey and control and an appendix on laboratory methods. The list of references is full.

The book appears to fulfil its purpose of tabulating and presenting necessary facts. To the British reader the section dealing with Tropical America (including the Islands) is likely to be valuable for the fauna of that area is complex (40 *Anophelis* are listed) known has recently increased and collective works are few.

plus

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Bart	Bartonellosis	Lep	Leprosy
Bb	Benber	Lept	Leptospirosis
Bl	Blackwater	Mal	Malaria
B R	Book Review	M sc	Miscellaneous
Chl	Cholera	Oph	Tropical Ophthalmology
Der	Dermatology and Fungus Diseases	Pl	Plague
Diet	Deficiency Diseases including Epidemic Dropsy	Rab	Rabies
Dys	Dysentery (Bacillary and Unclassed)	R F	Relapsing Fever and other Spirochaetoses
Fev	Feverers including Dengue and Sandfly Fever	Sp	Sprue
Haem	Haematology	Spec Re	Signifies Special Research
Hel	Helminthiasis	Tryp s	signifies Trypanosomiasis
		Typh	Typhus
		Vms	Venoms and Antivenenes
		Y F	Yellow Fever
		Y & S	Yaws and Syphilis

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